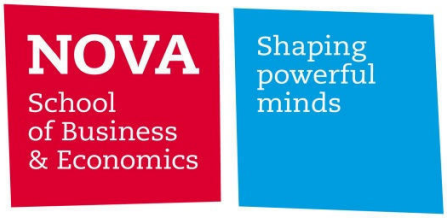

Nova School of Business and Economics

Universidade Nova de Lisboa

Thesis, presented as part of the requirements for the Degree of Doctor of Philosophy in Management

Does Ownership Structure Matter? Three Essays in Finance

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A Thesis carried out on the PhD in Management, under the supervision of Miguel Ferreira

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CONTENTS

INTRODUCTION

In this dissertation, we address a range of topics in the context of the impact of different types of ownership on corporate outcomes.

The first chapter compares the performance of local versus foreign institutional investors using a comprehensive data set of equity holdings in 32 countries during the 2000-2010 period. We find that foreign institutions perform as well as local institutions on average. Local institutions, however, perform better in stocks subject to high information asymmetry such as small, illiquid, growth, low analyst coverage and high insider ownership stocks. The local advantage is more pronounced in countries with low accounting transparency and high levels of corruption. Local investors also outperform foreigners in periods of market turmoil and in bear markets. While both domestic and foreign investors induce a strong price pressure effect on their stock holdings, only domestic investors show a trading pattern consistent with an information advantage.

The second chapter studies the long-term real effects of the rise in the internationalization of firm ownership structures. We find that greater foreign institutional ownership fosters long-term investment in R&D, fixed capital and human capital. Foreign institutions also lead to significant increases in innovation output and productivity. Using the exogenous variation in foreign institutional ownership that follows the addition of a stock to the MSCI World index, we show that the effect of foreign institutions on long-term investment and innovation output is causal. This effect is explained by the monitoring role of foreign institutions when managers are more entrenched. These findings challenge the popular belief that label foreign investors as “locusts” interested only in short-term gains and preventing firms from making long-term investments.

The third chapter studies the performance of equity mutual funds run by asset management divisions of commercial banking groups worldwide. We show that bank-affiliated funds underperform unaffiliated funds by 70 basis points per year. Consistent with conflicts of interest, the underperformance of affiliated funds is more pronounced among funds with larger stock holdings of the bank's lending clients. Disinvestments of asset management divisions by banking groups and placebo tests using international and passive funds support a causal interpretation of the results. Our findings suggest that affiliated funds support their lending division operations at the expense of fund investors.

Chapter I

Do Locals Know Better?

A Comparison of the Performance of Local and Foreign Institutional Investors*

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1. Introduction

Financial globalization and the substantial growth of the global mutual fund industry have expanded investment opportunities for global investors (Khorana, Servaes, and Tufano (2005)). Investors seeking to allocate money to foreign assets face a choice between investing through an international and perhaps sophisticated money management company or investing through a local management company (in the same country as the target securities) that may have better information about the local securities. Our research aims to shed light on which of these two investment options is better.

A large literature investigates the effects of geographic distance on investors' portfolio decisions and investment performance. Empirical evidence shows that the information asymmetry that foreign investors face is a determinant of their investment decision (e.g., Gehrig (1993), Chen, Covrig, and Ng (2005), and Leuz, Lins, and Warnock (2009)), which may help explain the home-bias phenomenon (French and Poterba (1991), Lewis (1999), and Karolyi and Stulz (2003)). Home bias may also be the outcome of rational investor choice, whether because of incentives to hold portfolios similar to those of their neighbors (Cole, Mailath, and Postlewaite (2001), DeMarzo, Kaniel, and Kremer (2004)) or to make their information set as different as possible from other investors (Nieuwerburgh and Veldkamp (2009)). The preference of investors for local stocks takes place not only internationally, but also domestically. U.S. money managers and analysts who are geographically closer to the headquarters of a firm seem to have an information advantage (Coval and Moskowitz (2001), Malloy (2005), and Baik, Kang, and Kim (2010)).

Empirical evidence also indicates that local investors outperform foreigners on average: Shukla and Van Inwegen (1995) in the United States; Hau (2001) in Germany; Choe, Kho, and

Stulz (2005) in Korea; Dvorak (2005) in Indonesia; and Teo (2009) in Asia. Local analysts also seem to have an information advantage over foreign analysts (Bae, Stulz, and Tan (2008)).

In alternative to this local information advantage hypothesis, Albuquerque, Bauer, and Schneider (2009) develop a theory of equity trading in international markets that is consistent with the idea that foreign investors have private information that is valuable for trading in many countries simultaneously. Sophisticated U.S. investors may have a particular advantage in foreign markets over local investors through global private information that they have acquired in the U.S. market.

Consistent with this hypothesis, other authors find that foreign investors who participate in a market can actually be better informed than local investors: Grinblatt and Keloharju (2000) in Finland; Froot, O'Connell, and Seasholes (2001) in emerging markets; Huang and Shiu (2005) in Taiwan; Bailey, Mao, and Sirodom (2007) in Singapore and Thailand; and Froot and Ramadorai (2008) in closed-end funds of 25 countries. Some others find no difference between the performance of local and foreign investors: Kang and Stulz (1997) in Japan, and Seasholes and Zhu (2010) using portfolios of individual investors. In short, the evidence is mixed on whether local investors or foreigners have an information advantage.

We compare the performance of institutional investors in stocks of their own country (domestic holdings) to the performance of money managers located in other countries (foreign holdings). While most of the research to date compares investor performance in a single country (of stock market or institution origin), we use a large sample of institutional money managers in 32 countries over the 2000-2010 period. Sample limitations may be the reason for the mixed evidence in the literature, as a local advantage may differ according to stock and country characteristics. With our worldwide sample, we provide a more complete picture of the

performance of local and foreign investors around the world.

The results show that, on average, domestic and foreign investors perform equally well. The unconditional average return on domestic portfolios is statistically indistinguishable from the average return on foreign portfolios. We find that the levels of both types of institutional ownership – domestic and foreign – have significant forecasting power for one-quarter-ahead stock returns. This is consistent with the results of Gompers and Metrick (2001), but extended to a worldwide sample. Furthermore, we find that this effect of both holding types on future returns comes mostly from a price-pressure effect, rather than from the informed trading of institutional investors.

It is reasonable to expect that domestic investors may perform better in specific stocks or market conditions in the event of more information asymmetry. To test this hypothesis, we use several country-level and stock-level proxies for the quality of a firm's information environment. We find a local advantage in harder-to-value stocks, that is, in stocks with lower analyst following, more illiquid or volatile stocks, stocks with higher insider ownership or more concentrated ownership, and in smaller or lower book-to-market (growth) stocks.

Similarly, we find a local advantage in shares of firms located in more opaque countries, that is, in countries with weaker accounting standards or in countries with more corruption. There is also evidence of a local advantage during periods of higher aggregate market uncertainty. When information asymmetry is likely to be low, foreigners perform equally as well as or even outperform local investors.

To further analyze the local advantage in high-information asymmetry environments, we distinguish between the price-pressure and information explanations. Consistently with our hypothesis, we find that there is an "information" advantage of local investors in stocks with

high information asymmetry. While domestic investors increase their holdings of a stock before its price goes up, foreign investors do not.

2. Methodology

We start by examining the determinants of the level of institutional ownership. We run the regression:

$$IO_{i,t} = \beta_1 X_{i,t} + \gamma Dummies_{i,t} + \varepsilon_{i,t} \quad (1)$$

for either total institutional ownership ($IO_{i,t}$), domestic institutional ownership ($IO_{i,t}^{Dom}$), or foreign institutional ownership ($IO_{i,t}^{For}$). The independent variables (*X*) include firm-specific characteristics expected to influence the portfolio choice of institutional investors, namely, log book-to-market ratio (*BM*), log market capitalization (*SIZE*), volatility (*VOL*), turnover (*TURN*), log stock price (*PRICE*), MSCI index membership dummy (*MSCI*), momentum (*MOM*), dividend yield (*DY*), ADR dummy (*ADR*), analyst coverage (*ANALYSTS*), foreign sales (*FXSALES*), and closely held shares (*CLOSE*). We also include industry, country, and time dummies.

Our main research goal is to analyze the performance difference between the domestic and foreign holdings of institutional investors. We begin with a simple comparison of excess returns denominated in U.S. dollars. We calculate monthly value-weighted portfolio excess returns on the local and foreign equity holdings in each market, and then compare the time-series averages of the domestic and foreign portfolio returns.

To adjust returns for risk using the four-factor Carhart (1997) model, we run a time-series regression of portfolio returns on global risk factors:

$$R_{i,t} = \alpha_i + \beta_{1,i} RM_t + \beta_{2,i} SMB_t + \beta_{3,i} HML_t + \beta_{4,i} MOM_t + \varepsilon_{i,t} \quad (2)$$

where $R_{i,t}$ is the excess return in U.S. dollars of portfolio i (either the domestic or foreign portfolio) in month t; RM_t is the excess return in U.S. dollars on the global stock market; SMB_t (Small minus Big) is the return on the small capitalization minus the return on the large capitalization global portfolios; HML_t (High minus Low) is the return on the high book-to-market minus the return on the low book-to-market global portfolios; and MOM_t (Momentum) is the return of the past 12-month winners minus the return on the past 12-month losers global portfolios. The global RM_t, SMB_t, HML_t, and MOM_t factors are constructed as value-weighted averages across countries.

We first report the alpha from a simple univariate regression on the market factor, and then the alpha from the full regression on the four factors. In both cases, we are interested in whether the alpha for the portfolio of domestic holdings is different from the alpha for the portfolio of foreign holdings.

We also employ the risk adjustment method of Daniel, Grinblatt, Titman, and Wermers (1997), who subtract from each stock return the return of a well-diversified portfolio of similar size, book-to-market, and momentum (past-year return) attributes. The procedure first sorts all stocks into size quintiles, and then within each size quintile sorts stocks into book-to-market quintiles, and finally within book-to-market quintiles sorts stocks into momentum quintiles. The benchmark portfolios are formed by value-weighting the stocks within each of these 125 groups constructed at the global level. A given stock is then matched with one of the 125 portfolios on the basis of its size, book-to-market, and past-year return from the previous month. The return of the matched portfolio is subtracted from each stock return in each month to give the characteristic-adjusted return.

Next we study the performance difference between domestic and foreign institutional

ownership using multivariate regressions. Following Gompers and Metrick (2001) and Baik, Kang and Kim (2010), we run a regression of one-quarter-ahead stock returns ($R_{i,t+1}$) on the current levels of domestic and foreign institutional ownership:

$$R_{i,t+1} = \beta_1 IO_{i,t}^{Dom} + \beta_2 IO_{i,t}^{For} + \gamma_1 X_{i,t} + \gamma_2 Dummies_{i,t} + \varepsilon_{i,t} \quad (3)$$

where X includes several variables known to influence returns, and the dummies control for industry, country, and time patterns. A higher coefficient on IO for a type of investor suggests better performance of that group, in the sense that their stock pickings are followed by higher stock returns.

Given the literature, it is not clear whether we should expect any unconditional aggregate performance difference between domestic and foreign investors. Nevertheless, we expect domestic investors to perform better with regard to stocks and market conditions where information asymmetry is likely to be higher. To test this hypothesis, we split the sample using several country-level and stock-level proxies for the quality of the firm's information environment. We then run the same regression for each separate subsample and check whether the domestic holdings have stronger predictive ability in high information asymmetry environments.

There are two explanations for why a group of investors' flows may predict stock returns. The first, which is known in the literature as the *price-pressure* explanation, is that such investors generate movements in equity returns that are unrelated to underlying fundamentals. In models such as Frankel and Froot (1987), DeLong, Shleifer, Summers, and Waldmann (1990), Barberis and Shleifer (2003), and Hong and Stein (2003), the reliable trading pattern of a group of investors (e.g., positive feedback trading) temporarily soaks up the available liquidity for an asset. This pushes the asset price temporarily away from its fundamental value. As additional

liquidity arrives, however, this transitory effect is undone, and the asset price reverts to fundamental value. The second, which is known as the *information* explanation, is that one group of investors is more informed than other investors. This group of investors perceives relevant fundamentals better than other investors, and engages in purchases or sales when they anticipate movements in these fundamentals. When fundamentals are later revealed, equity prices adjust to their new level.

To understand the source of the local or foreign advantage, we employ the methodology of Gompers and Metrick (2001) and Baik, Kang, and Kim (2010). Specifically, we decompose total ownership into its lagged level ($IO_{i,t-1}$) plus its change ($\Delta IO_{i,t}$), and regress future returns on these variables:

$$R_{i,t+1} = \beta_1 IO_{i,t-1}^{Dom} + \beta_2 \Delta IO_{i,t}^{Dom} + \beta_3 IO_{i,t-1}^{For} + \beta_4 \Delta IO_{i,t}^{For} + \gamma_1 Controls_{i,t} + \gamma_2 Dummies_{i,t} + \varepsilon_{i,t} \quad (4)$$

A positive coefficient on the lagged level suggests a price-pressure explanation, while a positive coefficient on the first difference suggests an information explanation. As in the previous regression, we compare the performance of domestic and foreign investors both in the full sample and in subsamples that distinguish different information asymmetry environments.

3. Data and variable construction

3.1. Sample

Our sample combines several data sources. We first collect a list of all firms covered in the Datastream/WorldScope database for 32 countries. We also collect a set of characteristics for each firm and for its stock market from Datastream/WorldScope.

Institutions defined as professional money managers with discretionary control over assets

(such as mutual funds, pension funds, bank trusts, and insurance companies) are frequently required to disclose their holdings publicly. We obtain historical filings from the FactSet/LionShares database from January 2000 through December 2010 on a quarterly basis.

FactSet/LionShares is a leading source for institutional equity holdings worldwide. The data sources are public filings by investors, such as Securities and Exchange Commission (SEC) 13-F filings (fund family level) and N-SAR (individual fund level) in the United States. For equities traded outside the United States, FactSet/LionShares collects ownership data directly from sources such as national regulatory agencies or stock exchange announcements, mutual fund industry directories, and company proxies and annual reports. Ferreira and Matos (2008) use this data set to study the role of institutional investors in corporations around the world. Following Gompers and Metrick (2001), we set institutional ownership variables to zero if a stock is not held by any institution in FactSet/LionShares.

We extract the number of analysts following a stock from the IBES database. The list of MSCI components is obtained from the Bloomberg Financial Services database. Country-level variables are obtained from the World Bank collection of development indicators database. The Chicago Board Options Exchange (CBOE) volatility index (VXO series) is obtained from the CBOE website. Our final sample covers 632,505 firm-quarters. Table A1 in the Appendix provides variable definitions and data sources.

3.2. Classifying domestic versus foreign holdings

We first define total institutional ownership (*IO*) as the sum of the holdings of all institutions in a firm's stock divided by market capitalization at the end of each calendar quarter. We sum institutional positions in both local and American Depositary Receipts (ADR) shares.

For each stock, we compute the holdings of investors based on the country of the institution

that holds a position in the stock. We classify each institutional holding as *domestic* when a stock's country equals the institution's country and *foreign* when a stock's country does not equal the institution's country. We consider as a stock's country the country where the company is domiciled according to the Datastream/Worldscope database. We consider as an institution's country the country where the investment company is domiciled according to the FactSet/LionShares database.

We also explore alternative classifications of institutional holdings. First, we divide each institution's portfolio into a *same region* and *different region* portion, using the geographic region (Africa, Asia, Eastern Europe, Japan, Latin America, North America, Oceania, Western Europe) of the institution and of the stock. We classify an institutional holding as same region when an institution is located in the same region where the stock is domiciled. We classify an institutional holding as different region when an institution is located in a different region from the one where the stock is domiciled.

Finally, we divide each institution's portfolio into a *local* and *distant* portion, using the distance between the institution and the stock as in Coval and Moskowitz (2001). More specifically, we classify an institutional holding as local when an institution's country is less than 1,000 kilometers away from the stock's country (distance measured as the distance between capital cities). We classify an institutional holding as distant when an institution's country is more than 1,000 kilometers away from the stock's country.

Table 1 presents domestic versus foreign institutional holdings as a percentage of market capitalization in each country as of December 2010. Figure 1 shows that the prevalence of foreign and domestic institutional money managers varies considerably across countries. Domestic investors hold large fractions of the market in the United States, Canada, and Sweden,

but foreign institutions actually hold the largest fraction of local market capitalization in countries like Australia, France, Germany, Netherlands, and Switzerland.

3.3. Descriptive statistics

Table 2 provides summary statistics on stock returns, institutional ownership variables, and firm-level control variables. Table A1 in the Appendix provides variable definitions and data sources. Stock returns, volatility, turnover, share prices, and financial ratios are winsorized at the bottom and top 1%.

We find that the mean institutional ownership is 20.6%, with a median of 7.2%. The mean foreign ownership is small compared to the mean local ownership, 3.6% versus 17%. The mean one-quarter-ahead stock return is 3.2%. The mean book-to-market ratio is 0.87. The mean (median) market capitalization is $2.03 billion ($188.6 million). Stock return volatility is 14.5%, and turnover is 1.1, on average. The MSCI membership dummy shows that about 12% of our sample firms are included in the MSCI All Country World Index. Mean and median dividend yields are close to 2% and 1%, respectively. The ADR dummy shows that about 7% of our sample firms are cross-listed on a U.S. exchange. On average, our sample firms have one analyst following the stock. Finally, foreign sales are 18% of total sales, and closely held shares are 39% of shares outstanding.

4. Empirical results

4.1. Determinants of local and foreign institutional ownership

Table 3 presents the estimates of regressions of total, foreign, and domestic institutional ownership on several firm-level characteristics that may influence the preferences of institutions. Regressions also include industry, country, and time dummies to control for systematic

differences across these dimensions.

The results in Table 3 show that institutional investors, whether foreign or domestic, share many common preferences in their stock investments. Consistent with the findings of Gompers and Metrick (2001) and Baik, Kang, and Kim (2010), our results show a strong institutional demand for stocks with larger market capitalization, as indicated by the positive and significant coefficient on *Size*. We also find that institutions prefer stocks of firms with greater transparency and subject to less asymmetric information. Institutional holdings are positively correlated with the number of analysts following a stock and negatively correlated with the fraction of closely held shares by insiders. Moreover, the regressions also show that institutions prefer stocks with lower dividend yields and higher prices.

The preferences of domestic and foreign institutions, however, diverge on other characteristics: MSCI, ADR, foreign sales, momentum, book-to-market, turnover, and volatility. Foreign investors have a bias for companies in the MSCI World Index, the leading index used in international asset management, as shown by the positive MSCI coefficient. Foreign institutional ownership is about three percentage points higher for MSCI firms than non-MSCI firms. The negative MSCI coefficient for domestic institutions indicates that this investor group prefers non-MSCI stocks.

Foreign investors also prefer to invest in cross-listed firms. The positive *ADR* coefficient for foreign institutional investors shows the positive effect of cross-listing on a U.S. exchange. Foreign institutional ownership is five percentage points higher for firms with a U.S. cross-listing. When they invest domestically, institutions do not seem to prefer cross-listed firms. This finding is consistent with results in Ammer, Holland, Smith, and Warnock (2012) for U.S. investors.

Furthermore, foreign institutions prefer firms with larger fractions of foreign sales and firms with higher momentum. For domestic investors these variables do not seem to be relevant. Domestic investors prefer stocks with higher book-to-market ratios (value stocks), stocks of firms with lower volatility, and higher turnover stocks. Foreign investors prefer stocks with the opposite characteristics. These findings are in line with those in Ferreira and Matos (2008).

Finally, we investigate how periods of market uncertainty influence the preferences of investors. To proxy for periods of increased uncertainty we use two proxies: (1) the CBOE volatility index (*VIX*); and (2) a dummy that takes a value of one when the VIX exceeds its 75th percentile, and zero otherwise (*STRESS*). The results in Table 4 show that domestic investors increase their positions in periods of high market uncertainty, while foreign investors reduce their positions. Our results are in line with the finding of Giannetti and Laeven (2013) that the local bias in U.S. mutual funds is more pronounced at times of higher stock market uncertainty.

4.2. Average performance of domestic and foreign portfolios

Table 5 presents the time-series average of monthly excess returns for each country in the sample. For example, in the row for Australia, the domestic return represents the value-weighted average return of all Australian shares held by Australian investors, while the foreign return represents the value-weighted average return of all Australian shares held by investors located outside Australia. Our focus is on the difference between the returns of these two groups.

As the average excess returns of domestic and foreign holdings are similar, we cannot reject the hypothesis of equality of average excess returns at conventional significance levels in almost every country. Computing a global average excess return across all domestic and all foreign holdings, we find that domestic holdings earn an average return of 0.09% per month, while foreign holdings earn an average return of 0.18% per month. Overall, the difference in average

returns is not statistically significant.

This lack of statistical difference is confirmed when we use risk-adjusted returns. The alphas from the global market model, the alphas from a global four-factor model, and the average characteristics-adjusted returns consistently show that the performance of domestic investors is statistically similar to the performance of foreign investors.

To verify that these results do not depend on our domestic and foreign institution classifications, the last two rows of the table show global average returns according to alternative classifications of holdings from the same versus different geographic region and from close versus distant investors.[1] Once again, we find that the performance of the two groups of investors is not significantly different.

We find overall that domestic and foreign holdings of institutional investors earn similar average stock returns. However, this unconditional average may mask significant return differences in specific stocks or market conditions. We explore this possibility in the following sections.

4.3. Domestic versus foreign institutions: Who does better?

In this section, we examine how future stock returns are related to total, local, and foreign institutional ownership using multivariate regressions. We expand the Gompers and Metrick (2001) analysis of U.S. stocks to a worldwide panel with firms from 32 countries. Table 6 presents the results of regressing future quarterly stock returns on institutional ownership as well as several control variables.

First, we find that the level of total institutional ownership predicts one-quarter-ahead stock returns (column (1)). To further analyze this result, we follow Gompers and Metrick (2001) and

[1] The results at the country level are available in Table IA.1 (Internet Appendix).

Baik, Kang, and Kim (2010), and use the level of lagged institutional ownership as a measure of future institutional demand and the change in institutional ownership as a measure of institutional information advantage. The results in model 2 show that the coefficient on lagged institutional ownership is significantly positive, while the change in institutional ownership is not statistically significant. This suggests that institutional flows predict future stock returns due to a demand shock explanation, which is in line with the results in Gompers and Metrick (2001). Hence, our results suggest that institutions worldwide do not seem to have a significant information advantage over other investors such as insiders and individuals.

Next, we compare the performance of institutional investors in domestic and foreign holdings, classified according to the nationality of the domicile of the institution and of the stock. Columns (3), (5), and (7) present the results. The coefficients show that a 10 percentage point increase in domestic institutional ownership increases one-quarter-ahead returns by 0.4%, while the effect is only slightly lower for foreign institutional ownership at 0.3%. To compare both coefficients, we run an F-test for the equality of coefficients on local and foreign institutional ownership. We cannot reject the null of equal coefficients at the 5% significance level. Therefore, using a worldwide sample, we conclude that neither domestic investors nor foreign investors have a performance edge over the other. This finding may help to explain why the results in single-country studies are mixed in general.

To disentangle the smart institutions and demand shock explanations, we also run a specification with the level of and changes in domestic and foreign institutional ownership (columns (4), (6), and (8)). Lagged institutional ownership is positive for both domestic and foreign holdings, consistent with a demand shock effect. Furthermore, we find that foreign institutions seem to be at a slight information disadvantage. While an increase in foreign

holdings is associated with a reduction in future stock returns, a change in local holdings is not statistically related to future returns.

To summarize, our results generalize to a worldwide basis the finding of Gompers and Metrick (2001) for the U.S. market. We find that the unconditional forecasting power of institutional ownership for stock returns comes from a demand shock effect, not from a smart institutions effect.

4.4. Who does better in which stock?

It is possible that local and foreign investors perform differently in markets and stocks with different levels of information asymmetry (Baik, Kang, and Kim (2010)). Therefore, we investigate further the performance of local and foreign investors conditioning on different stock and country characteristics.

To test whether the extent of information asymmetry influences the performance of local and foreign institutions, we examine the difference in performance between both types of institutions across a variety of stock characteristics. To do so, we first divide stocks into those with high information asymmetry and those with low information asymmetry, and then test the equality of the coefficients in the regression of quarterly future stock returns on domestic and foreign institutional ownership (and other firm- and country-level controls). Panel A of Table 7 shows the results.

Our first proxy for information asymmetry is the number of analysts covering the stock. Coverage by analysts can significantly reduce any information gap between local and foreign institutions. The results show that domestic institutions have an advantage in firms without any analyst coverage, i.e., in firms where the information asymmetry is likely to be higher. For these firms, the coefficient on the level of *domestic* institutional ownership is 0.069, while the

coefficient on *foreign* institutional ownership is not statistically different from zero.

To better gauge the economic significance of the results, suppose that the level of domestic ownership increases by 10 percentage points. Then, the one quarter-ahead stock return increases on average by 69 basis points. An increase in *foreign* ownership, however, is not related to future stock returns in these firms that have no analyst coverage.

For firms that are covered by at least one analyst, i.e., where the information asymmetry is likely to be lower, foreign institutions perform better. Here, an increase of 10 percentage points in the level of domestic ownership is followed on average by an increase of 26 basis points in the following quarter return, while the same increase in foreign ownership is followed by a larger increase of 45 basis points. This difference is statistically significant.

Other proxies for information asymmetry confirm this pattern. First, we split the sample according to the volatility of the stock. In stocks with higher volatility there is more room for exploitable information asymmetry trading opportunities. The results show that domestic institutions perform better than foreign institutions in firms with high volatility, while the reverse is true for firms with low volatility.

Next, we analyze how performance changes with the ownership structure of the firm. We expect domestic institutions to be at an advantage in firms with high insider ownership, as there are more private benefits of control, and managers will have fewer incentives to seek transparency. Indeed, the results show that domestic holdings forecast returns in firms with high insider ownership, while foreign holdings do not. Foreign holdings actually have a stronger effect on future returns than domestic holdings in firms with low insider ownership. This pattern is also confirmed using an Herfindahl index of ownership concentration. We find that foreign investors significantly outperform domestic investors in firms with a low index, i.e., in firms

where there is more dispersion of ownership and thus probably less information asymmetry.

Our tests also include additional proxies for information asymmetry that again confirm that domestic investors have an advantage in stocks with high information asymmetry, and there is no statistically significant difference between domestic and foreign investors in stocks with low information asymmetry. One proxy is firm size, measured by the value of the firm's assets in U.S. dollars, as larger firms are usually considered to have lower information asymmetry than smaller firms. We find that domestic institutions have an advantage in small firms, while for large firms the difference between the ownership coefficients is not statistically significant.

Another proxy is the book-to-market ratio (B/M). Value stocks are usually characterized by more stable cash flows, while growth stocks need a clearer insight about the prospects of future growth opportunities, i.e., the information asymmetry is likely higher in growth stocks (low B/M). Accordingly, the results show that domestic holdings have a stronger predictive ability than foreign holdings in growth stocks, while there is no statistically significant difference in value stocks. Domestic institutions seem to take advantage of their geographic proximity to better assess future growth prospects of companies domiciled in the institution's country.

We also compare the performance of domestic and foreign institutions in liquid versus illiquid stocks, measuring illiquidity by the percentage of days with zero stock return, as illiquidity is positively related to information asymmetry. Again, the results show that domestic investors possess an edge over foreign investors in illiquid stocks and that foreigners perform equally well in liquid stocks.

In summary, the results show that domestic institutions outperform foreign institutions in stocks with high information asymmetry, i.e., in stocks that are less easily understood by foreigners. On the other hand, foreigners perform equally well or even outperform local investors

in stocks with low information asymmetry.

4.5. Who does better in which market condition?

To evaluate how the performance of local and foreign investors varies with market conditions, we explore the ex-post performance of both categories of investors during periods of different market performance and volatility. Panel B of Table 7 presents the results.

First, we analyze the returns of local and foreign stocks held by institutions during different market cycles by splitting the sample into bull and bear markets. Specifically, we consider that the periods from 2000:Q1 through 2002:Q2 and from 2008:Q1 through 2009:Q1 are characterized by a bear market, while the other periods are characterized by a bull market. The results show that during bear markets local investors have a clear advantage. While domestic holdings forecast future positive returns, foreign holdings forecast negative returns. However, there is a slight foreign advantage during bull markets. This is consistent with the idea that the information asymmetry is greater during worse economic conditions.

Second, we compare the performance of local and foreign institutions in different periods of market uncertainty. As in Table 4, we again define a period of increased market uncertainty when the VIX is above its 75th percentile. The results in Table 7 show that local investors have a significant return forecasting advantage over foreigners in periods of increased market uncertainty (stress period). However, in periods of low uncertainty (no stress period) foreigners do as well as local investors.

Overall, the results show that domestic institutions outperform foreign institutions in periods of market turmoil. This adds to the previous results (in Table 4) that domestic money managers increase their holdings in periods of increased market uncertainty, while foreign institutions reduce their holdings. During periods of market turmoil, it may be more costly or more difficult

for institutional investors to acquire information in foreign stocks, increasing the gains of investing domestically during these periods. These findings are consistent with theories linking the home bias to an information advantage over local stocks (Brennan and Cao (1997)). Our results extend to portfolios of international equity investors worldwide the findings of Giannetti and Laeven (2013) that the U.S. local bias is more pronounced in periods of market uncertainty, and fund managers earn superior returns on local stocks during these periods.

4.6. Who does better in which country type?

In Panel C of Table 7 we examine how the performance of local and foreign holdings varies according to characteristics of the country where the firm is located. The results show that domestic investors outperform foreign investors in countries with low levels of accounting standards and in countries with high levels of corruption. There is no statistically significant difference between domestic and foreign holdings in countries with high accounting standards and low levels of corruption. This is consistent with the notion that in countries with weaker legal institutions and worse information environment, local money managers are able to take advantage of the information asymmetry.

We also find that domestic institutions outperform foreigners in countries with weaker investor protection (i.e., anti-director rights index below four), while foreigners outperform domestic in countries with strong investor protection (i.e., anti-director rights index equal to or above four). The differences in the two groups, however, are not statistically significant.

Finally, we examine performance by geographic region, splitting the sample between U.S. and non-U.S. stocks. In this case, we do not find a statistically significant difference between local and foreign institutions. Therefore, the relative performance of domestic and foreign institutional investors in the U.S. market does not seem to be much different from that in other

worldwide markets.

4.7. Price pressure or information?

So far we have shown no significant performance gap between domestic and foreign investors. When we split the sample to control for the extent of information asymmetry, however, we find that local investors outperform foreigners in stocks with higher information asymmetry. The local advantage disappears (and sometimes is even reversed) in stocks with lower information asymmetry.

To further understand the source of these performance differences, we run a regression of future returns on the level of and changes in domestic and foreign institutional ownership. A positive coefficient on the level of ownership suggests a price pressure or demand shock effect, while a positive coefficient on the change in ownership suggests an information or smart institutions effect.

Table 8 shows the results using the same sample splits as in Table 7. Coefficients on the level of ownership are significantly positive for both domestic and foreign institutions in almost every sample split. This indicates that, whatever the information environment, institutions have a strong price pressure effect, which is consistent with earlier results.

More important, we find evidence of a smart institutions effect in several cases where there is likely to be more information asymmetry. In particular, when we split the sample according to individual firm characteristics (Panel A of Table 8), we find that increases in the holdings of domestic investors predict higher future returns in firms with no analyst coverage, in illiquid firms, and in firms with a high percentage of closely held shares. In contrast, a change in the holdings of foreign investors does not predict returns in these firms.

The results also suggest an information difference according to market condition (Panel B of

Table 8). During bear markets or during periods of higher market uncertainty, foreign investors rebalance their portfolios in the wrong direction, that is, an increase in their holdings is followed by lower stock returns. Domestic investors, though, are able to trade in the right direction, particularly during bear markets.

Finally, the results also show that the information advantage of domestic investors depends on the country characteristics (Panel C of Table 8). In countries with high levels of corruption and weak investor protection, an increase in the holdings of domestic investors is followed by higher stock returns, while an increase in the holdings of foreign investors is followed by lower stock returns.

Overall, our results show that domestic institutions trade with an information advantage over foreign institutions in firms or markets where there is a higher information asymmetry. Our results show that that the information advantage of domestic investors shows up only in stocks or market conditions where the information asymmetry is likely to be high using a global sample of 32 countries.

5. Robustness

5.1. Alternative institutional ownership classifications

Our main results use a classification of domestic or foreign holdings according to the nationality of the institution versus the nationality of the stock. We now check whether the results are robust to alternative classifications.

First, we consider a coarser criterion of geographic region instead of country, and split holdings into same region and different region (Panel A of table 9). Second, we measure proximity by the actual geographical distance, and split holdings into local and distant (Panel B

of Table 9).

The results in Table 9 are similar across the two classifications. We find that all institutional holdings variables predict one-quarter-ahead stock returns. All coefficients are statistically significant and quite similar in magnitude to the coefficients based on the domestic and foreign classification in Table 6. We also decompose the level of holdings into its first difference and the lagged level, in order to distinguish the price pressure from the smart institutions effect. In both classifications, we find evidence of a price pressure effect, but not of a smart institutions effect. Again, these results are consistent with our primary conclusions based on the domestic and foreign classification.

In summary, we find no difference between same versus different region investors and between local versus distant investors. Hence, these results confirm that our findings are robust to different classifications of institutional ownership, including the geographic proximity measure used by Coval and Moskowitz (2001).

5.2. Additional tests

To further check the robustness of our results we complete our analysis with three additional tests. First, we run Fama-MacBeth (1973) regressions and find no statistically significant difference between the return forecasting power of domestic and foreign institutions (Table 10, Panel A). Next, we perform the same regression but clustering standard errors at the country level (Table 10, Panel B). Again, we cannot find a statistically significant difference between local and foreign investors. Finally, we perform a regression with standard errors adjusted to two dimensions of clustering: by stock and by quarter (Table 10, Panel C). We also cannot reject the equality of coefficients between domestic and foreign institutional ownership.

In all three panels we find evidence of a price pressure effect, but no evidence for a smart

institutions effect. If anything, we find weak evidence that foreign institutions are at a slight information disadvantage when standard errors are clustered at the country level (column (8) in Panel B). To sum up, our additional tests show that our benchmark results are robust to different forms of cross-sectional and temporal dependence.

6. Conclusion

To the best of our knowledge, we are the first to examine the portfolio performance of domestic institutions versus foreign-based institutions using a worldwide sample of stocks. We find that domestic institutional investors perform as well as foreign institutional investors during the 2000-2010 period, although, domestic institutions enjoy superior return forecasting power in stocks with high information asymmetry. While both types of institutional holdings have a strong price pressure effect, only domestic investors seem to have an information advantage, which is more pronounced when information asymmetry is higher.

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Table 1
Domestic and foreign institutional ownership

This table reports, for each country in the sample, the average across all firms of total institutional ownership (*IO*), domestic institutional ownership (*IO_DOM*), and foreign institutional ownership (*IO_FOR*) in percentage of market capitalization as of December 2010.

Country	*IO*	*IO_DOM*	*IO_FOR*	Number of firms
Australia	0.156	0.022	0.134	821
Austria	0.179	0.018	0.162	69
Belgium	0.160	0.013	0.147	96
Brazil	0.252	0.047	0.205	153
Canada	0.498	0.272	0.227	675
China	0.184	0.022	0.162	442
Denmark	0.260	0.055	0.205	98
Finland	0.297	0.086	0.211	97
France	0.221	0.052	0.170	453
Germany	0.234	0.048	0.186	389
Hong Kong	0.144	0.027	0.117	853
India	0.137	0.040	0.097	1,340
Ireland	0.394	0.007	0.387	45
Israel	0.329	0.009	0.320	92
Italy	0.155	0.013	0.142	219
Japan	0.137	0.041	0.097	1,747
Korea (South)	0.149	0.001	0.148	779
Luxembourg	0.278	0.002	0.276	21
Malaysia	0.080	0.008	0.072	569
Netherlands	0.334	0.034	0.299	98
Norway	0.233	0.101	0.132	120
Poland	0.212	0.134	0.079	135
Portugal	0.115	0.010	0.105	37
Singapore	0.134	0.023	0.110	415
South Africa	0.213	0.046	0.166	180
Spain	0.168	0.014	0.154	119
Sweden	0.363	0.234	0.129	185
Switzerland	0.282	0.048	0.235	207
Taiwan	0.176	0.017	0.159	596
Thailand	0.121	0.019	0.102	324
U.K.	0.299	0.121	0.178	1,067
U.S.	0.728	0.649	0.079	3,916
Total	0.398	0.269	0.129	16,357

Table 2
Summary statistics

This table reports mean, median, standard deviation, minimum, maximum, and number of observations for firm-level variables. Refer to Table A1 in the Appendix for variable definitions. The sample period is from 2000 to 2010.

	Mean	Median	Standard deviation	Minimum	Maximum	Observations
RET	0.032	0.012	0.277	-0.667	1.333	632,505
IO	0.206	0.072	0.282	0.000	1.000	632,505
IO_DOM	0.170	0.026	0.274	0.000	1.000	632,505
IO_FOR	0.036	0.006	0.073	0.000	1.000	632,505
BM	0.868	0.647	0.785	0.029	4.733	632,505
SIZE ($ Mil.)	2,029.39	188.60	10,600.73	10.00	571,197.10	632,505
VOL	0.145	0.115	0.123	0.009	1.467	632,505
TURN	1.117	0.540	1.679	0.001	12.605	632,505
PRICE	2.719	2.547	2.658	-3.297	11.419	632,505
MSCI	0.121	0.000	0.326	0.000	1.000	632,505
MOM	0.225	0.072	0.804	-0.894	5.044	632,505
DY	0.020	0.009	0.031	0.000	0.179	632,505
ADR	0.068	0.000	0.252	0.000	1.000	632,505
ANALYSTS	1.043	0.693	0.995	0.000	4.007	632,505
FXSALES	0.183	0.000	0.287	0.000	0.975	632,505
CLOSE	0.394	0.379	0.251	0.001	0.980	632,505

Table 3
Determinants of institutional ownership

This table reports estimates of coefficients of the quarterly time-series cross-sectional firm-level regression of total institutional ownership (*IO*), domestic institutional ownership (*IO_DOM*), and foreign institutional ownership (*IO_FOR*) as a percentage of market capitalization. Regressions include industry, country, and time dummies. Refer to Table A1 in Appendix A for variable definitions. The sample period is from 2000 to 2010. The robust *t*-statistics in parentheses are adjusted for clustering at the firm-level. *, **, and *** indicates significance at the 10%, 5% and 1% levels respectively.

	IO	*IO_DOM*	*IO_FOR*
BM	0.024***	0.026***	-0.001***
	(23.17)	(24.49)	(-3.18)
SIZE	0.045***	0.042***	0.003***
	(46.89)	(47.39)	(7.14)
VOL	-0.189***	-0.194***	0.005***
	(-35.29)	(-35.82)	(3.82)
TURN	0.0187***	0.019***	-0.001***
	(30.75)	(32.88)	(-3.35)
PRICE	0.010***	0.007***	0.003***
	(13.53)	(9.30)	(11.77)
MSCI	-0.078***	-0.106***	0.028***
	(-21.14)	(-30.46)	(16.93)
MOM	0.002***	-0.0002	0.002***
	(3.28)	(-0.41)	(9.69)
DY	-0.401***	-0.367***	-0.034***
	(-16.75)	(-16.31)	(-4.04)
ADR	-0.032***	-0.085***	0.053***
	(-7.36)	(-24.25)	(17.80)
ANALYSTS	0.052***	0.038***	0.014***
	(36.21)	(29.03)	(21.87)
FXSALES	0.020***	0.002	0.018***
	(5.84)	(0.63)	(11.53)
CLOSE	-0.124***	-0.095***	-0.029***
	(-30.34)	(-24.24)	(-19.09)
Number of observations	637,415	637,415	637,415
R-squared	0.684	0.687	0.373

Table 4
Determinants of institutional ownership and market uncertainty

This table reports estimates of coefficients of the quarterly time-series cross-sectional firm-level regression of total institutional ownership (*IO*), domestic institutional ownership (*IO_DOM*), and foreign institutional ownership (*IO_FOR*) as a percentage of market capitalization. Regressions include industry, country, and time dummies. Refer to Table A1 in Appendix A for variable definitions. The sample period is from 2000 to 2010. Robust *t*-statistics in parentheses are adjusted for clustering at the firm-level. *, **, and *** indicates significance at the 10%, 5% and 1% levels respectively.

	IO	*IO_DOM*	*IO_FOR*	*IO*	*IO_DOM*	*IO_FOR*
VIX	0.004***	0.007***	-0.003***			
	(3.54)	(6.15)	(-6.42)			
STRESS				0.002***	0.002***	-0.0004***
				(8.23)	(10.53)	(-5.61)
BM	0.024***	0.025***	-0.001***	0.024***	0.025***	-0.001***
	(23.08)	(24.40)	(-3.20)	(23.08)	(24.41)	(-3.20)
SIZE	0.044***	0.042***	0.003***	0.044***	0.042***	0.003***
	(47.04)	(47.48)	(7.33)	(47.03)	(47.47)	(7.32)
VOL	-0.188***	-0.193***	0.006***	-0.188***	-0.193***	0.006***
	(-35.19)	(-35.79)	(4.10)	(-35.19)	(-35.78)	(4.09)
TURN	0.019***	0.019***	-0.001***	0.019***	0.019***	-0.001***
	(30.73)	(32.87)	(-3.38)	(30.73)	(32.87)	(-3.38)
PRICE	0.010***	0.007***	0.003***	0.010***	0.007***	0.003***
	(13.59)	(9.39)	(11.73)	(13.59)	(9.38)	(11.73)
MSCI	-0.077***	-0.105***	0.028***	-0.077***	-0.105***	0.028***
	(-21.11)	(-30.42)	(16.91)	(-21.11)	(-30.42)	(16.91)
MOM	0.001*	-0.001*	0.002***	0.001*	-0.001*	0.002***
	(1.84)	(-1.70)	(9.12)	(1.82)	(-1.73)	(9.16)
DY	-0.400***	-0.366***	-0.034***	-0.400***	-0.366***	-0.034***
	(-16.72)	(-16.28)	(-4.05)	(-16.72)	(-16.29)	(-4.05)
ADR	-0.032***	-0.085***	0.053***	-0.032***	-0.085***	0.053***
	(-7.36)	(-24.25)	(17.79)	(-7.36)	(-24.25)	(17.79)
ANALYSTS	0.053***	0.038***	0.014***	0.052***	0.038***	0.014***
	(36.34)	(29.18)	(21.83)	(36.33)	(29.17)	(21.83)
FXSALES	0.020***	0.002	0.018***	0.020***	0.002	0.018***
	(5.86)	(0.66)	(11.51)	(5.86)	(0.65)	(11.51)
CLOSE	-0.124***	-0.095***	-0.029***	-0.124***	-0.095***	-0.029***
	(-30.33)	(-24.23)	(-19.07)	(-30.33)	(-24.23)	(-19.07)
Number of observations	637,415	637,415	637,415	637,415	637,415	637,415
R-squared	0.683	0.687	0.373	0.683	0.687	0.373

Table 5
Portfolio tests

This table shows value-weighted returns on the portfolios of domestic and foreign institutional holdings. The average monthly return in excess of the risk-free rate, the alpha from a global market factor, and the alpha from a global four-factor (Carhart) model, and the average return after subtracting from each stock the return on a portfolio with similar size, book-to-market, and momentum are shown. The sample period is from 2000 to 2010.

Country	Excess Return			Alpha (global market model)			Alpha (global Carhart model)			Characteristics-adjusted return		
	Domestic holdings	Foreign holdings	Difference t-statistic	Domestic holdings	Foreign holdings	Difference t-statistic	Domestic holdings	Foreign holdings	Difference t-statistic	Domestic holdings	Foreign holdings	Difference t-statistic
Australia	1.27%	1.45%	-1.04	0.96%	1.12%	-0.94	0.26%	0.52%	-1.29	0.11%	0.36%	-1.46
Austria	1.19%	0.71%	2.92	0.93%	0.43%	3.08	-0.37%	-0.68%	1.71	-0.58%	-0.56%	-0.13
Belgium	0.47%	0.24%	1.54	0.16%	-0.07%	1.57	-0.70%	-0.68%	-0.13	-0.87%	-0.99%	0.87
Brazil	1.92%	1.84%	0.25	1.57%	1.47%	0.33	1.94%	1.92%	0.05	0.43%	0.39%	0.27
Canada	0.89%	0.58%	1.05	0.66%	0.29%	1.30	0.33%	1.04%	-2.94	-0.23%	-0.26%	0.16
China	1.52%	0.87%	1.53	1.20%	0.55%	1.52	1.40%	0.53%	1.79	-0.27%	-0.76%	1.07
Denmark	0.60%	0.98%	-1.78	0.29%	0.71%	-2.05	-0.09%	0.62%	-3.07	-0.96%	-0.39%	-3.80
Finland	0.90%	0.02%	1.66	0.36%	-0.60%	1.79	0.31%	0.30%	0.02	-0.61%	-1.18%	1.29
France	0.27%	0.27%	0.01	0.02%	0.02%	-0.04	-0.37%	-0.35%	-0.28	-0.77%	-0.77%	-0.01
Germany	0.27%	0.22%	1.05	-0.01%	-0.07%	1.05	-0.16%	-0.16%	0.04	-0.88%	-0.80%	-1.94
Hong Kong	0.84%	0.67%	1.62	0.60%	0.43%	1.63	0.88%	0.87%	0.12	-0.45%	-0.56%	1.21
India	1.55%	1.31%	1.30	1.24%	1.02%	1.23	1.08%	0.99%	0.43	0.16%	0.18%	-0.09
Ireland	0.00%	-0.03%	0.11	-0.26%	-0.28%	0.06	-1.05%	-0.88%	-0.49	-1.12%	-1.50%	1.20
Israel	-0.51%	-0.73%	0.23	-0.04%	-0.42%	0.46	2.12%	1.67%	0.44	-2.46%	-1.33%	-1.18
Italy	0.07%	0.13%	-0.77	-0.26%	-0.18%	-0.96	-0.70%	-0.68%	-0.22	-1.00%	-0.90%	-1.29
Japan	-0.34%	-0.35%	0.10	-0.51%	-0.52%	0.12	-0.54%	-0.57%	0.41	-1.08%	-1.03%	-0.63
Korea (South)	1.16%	0.92%	0.93	0.83%	0.62%	0.85	1.14%	0.78%	1.25	-0.48%	-0.17%	-1.25
Luxembourg	0.68%	0.65%	0.06	0.20%	-0.01%	0.38	-0.15%	1.17%	-2.31	-0.74%	-0.68%	-0.11
Malaysia	1.33%	1.48%	-1.21	0.52%	0.70%	-1.39	0.37%	0.54%	-1.19	-0.95%	-0.24%	-4.79
Netherlands	0.26%	0.27%	-0.09	-0.01%	0.01%	-0.22	-0.46%	-0.37%	-0.79	-0.89%	-0.67%	-1.93
Norway	1.15%	1.19%	-0.26	0.68%	0.71%	-0.25	0.40%	0.21%	1.26	-0.65%	-0.40%	-1.82
Poland	1.82%	1.78%	0.20	0.47%	0.49%	-0.08	-0.29%	-0.30%	0.02	-1.10%	-0.52%	-2.63
Portugal	0.44%	0.65%	-0.78	-0.01%	0.21%	-0.86	-0.05%	0.74%	-2.74	-1.05%	-0.45%	-2.11
Singapore	0.67%	0.42%	0.46	0.41%	0.08%	0.65	0.28%	1.25%	-1.78	-0.59%	-0.78%	0.39
South Africa	1.67%	1.61%	0.14	1.13%	1.10%	0.07	0.52%	0.38%	0.30	0.14%	0.35%	-0.54
Spain	0.59%	0.53%	0.59	0.28%	0.21%	0.68	-0.05%	0.10%	-1.24	-0.60%	-0.56%	-0.41
Sweden	0.48%	0.25%	1.89	0.16%	-0.07%	1.88	0.58%	0.53%	0.36	-0.41%	-0.44%	0.32
Switzerland	0.49%	0.37%	1.25	0.31%	0.19%	1.22	-0.10%	-0.04%	-0.56	-0.45%	-0.40%	-0.71
Taiwan	2.31%	2.39%	-0.35	0.13%	0.48%	-1.55	0.41%	0.69%	-1.12	-0.23%	0.13%	-1.94
Thailand	1.75%	1.81%	-0.54	1.46%	1.51%	-0.47	1.20%	1.41%	-1.56	0.08%	0.43%	-3.38
United Kingdom	0.21%	0.10%	1.08	0.01%	-0.09%	0.98	-0.38%	-0.32%	-0.51	-0.88%	-0.79%	-0.90
United States	0.04%	-0.02%	1.60	-0.16%	-0.22%	1.52	-0.10%	-0.08%	-0.56	-0.78%	-0.79%	0.56
All countries:												
Domestic - Foreign	0.09%	0.18%	-0.59	-0.12%	-0.05%	-0.43	-0.06%	0.04%	-0.64	-0.77%	-0.70%	-0.51
Same - Different Region	0.11%	0.13%	-0.13	-0.10%	-0.09%	-0.04	-0.04%	-0.02%	-0.13	-0.76%	-0.72%	-0.33
Close - Distant Investors	0.10%	0.17%	-0.46	-0.11%	-0.06%	-0.34	-0.05%	0.03%	-0.49	-0.76%	-0.71%	-0.43

Table 6
Regression of future returns on levels of and changes in total, domestic and foreign institutional ownership

This table reports estimates of coefficients of the quarterly time-series cross-sectional firm-level regression of one-quarter-ahead returns on levels of and changes in total institutional ownership (*IO*), domestic institutional ownership (*IO_DOM*), and foreign institutional ownership (*IO_FOR*) and other firm characteristics. Regressions include industry, country and time dummies. Refer to Table A1 in Appendix A for variable definitions. The sample period is from 2000 to 2010. Robust t-statistics in parentheses are adjusted for clustering at the firm-level. *, **, and *** indicates significance at the 10%, 5% and 1% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IO_t	0.040***							
	(18.22)							
IO_{t-1}		0.037***						
		(16.93)						
Δ *IO*		-0.011						
		(-1.10)						
IO_DOM_t			0.039***				0.041***	
			(17.29)				(17.71)	
IO_DOM_{t-1}				0.035***				0.037***
				(15.50)				(16.05)
Δ *IO_DOM*				-0.004				-0.003
				(-0.34)				(-0.24)
IO_FOR_t					0.021***		0.031***	
					(3.98)		(5.86)	
IO_FOR_{t-1}						0.028***		0.038***
						(5.38)		(7.08)
Δ *IO_FOR*						-0.059**		-0.055**
						(-2.19)		(-2.04)
BM	0.018***	0.019***	0.018***	0.019***	0.019***	0.019***	0.018***	0.019***
	(32.89)	(33.25)	(32.78)	(33.24)	(34.97)	(35.28)	(32.78)	(33.21)
SIZE	-0.003***	-0.002***	-0.002***	-0.002***	-0.001**	-0.001***	-0.003***	-0.002***
	(-6.86)	(-6.64)	(-6.58)	(-6.30)	(-2.37)	(-2.66)	(-6.90)	(-6.62)
VOL	-0.084***	-0.078***	-0.084***	-0.078***	-0.091***	-0.085***	-0.084***	-0.078***
	(-18.07)	(-16.87)	(-18.01)	(-16.83)	(-19.70)	(-18.36)	(-18.01)	(-16.87)
TURN	-0.005***	-0.004***	-0.005***	-0.004***	-0.004***	-0.003***	-0.005***	-0.004***
	(-16.44)	(-15.01)	(-16.47)	(-14.94)	(-13.99)	(-12.53)	(-16.48)	(-14.94)
PRICE	-0.010***	-0.009***	-0.010***	-0.009***	-0.009***	-0.009***	-0.010***	-0.009***
	(-28.23)	(-27.41)	(-27.85)	(-27.03)	(-27.20)	(-26.49)	(-28.07)	(-27.31)
MSCI	0.006***	0.006***	0.007***	0.007***	0.002*	0.003***	0.006***	0.006***
	(5.36)	(5.90)	(6.26)	(6.60)	(1.87)	(2.61)	(5.62)	(5.88)
MOM	0.007***	0.010***	0.007***	0.010***	0.007***	0.010***	0.007***	0.010***
	(12.00)	(15.92)	(12.07)	(15.85)	(11.88)	(15.61)	(12.02)	(15.93)
DY	0.220***	0.212***	0.219***	0.211***	0.205***	0.199***	0.220***	0.212***
	(17.50)	(16.88)	(17.39)	(16.76)	(16.39)	(15.90)	(17.50)	(16.87)
ADR	-0.002	-0.001	0.0002	0.0005	-0.004***	-0.004***	-0.001	-0.001
	(-1.42)	(-1.01)	(0.15)	(0.36)	(-3.16)	(-2.96)	(-0.98)	(-1.00)
ANALYSTS	0.010***	0.009***	0.010***	0.010***	0.012***	0.011***	0.010***	0.009***
	(17.47)	(16.27)	(18.60)	(17.46)	(20.75)	(19.16)	(17.53)	(16.18)
FXSALES	0.005***	0.005***	0.006***	0.006***	0.005***	0.005***	0.005***	0.005***
	(3.42)	(3.43)	(3.92)	(3.89)	(3.72)	(3.61)	(3.52)	(3.42)
CLOSE	0.017***	0.017***	0.016***	0.016***	0.013***	0.013***	0.017***	0.017***
	(10.40)	(10.24)	(9.79)	(9.62)	(7.95)	(8.14)	(10.28)	(10.21)
Number of observations	632,505	620,038	632,505	620,038	632,505	620,038	632,505	620,038
R-squared	0.207	0.208	0.207	0.208	0.206	0.208	0.207	0.208
Test-of-difference in coefficients (p-values) between:								
IO_DOM = IO_FOR							0.09	0.87
Δ *IO_DOM = Δ IO_FOR*								0.07

Table 7
Regression of future returns on levels of local and nonlocal institutional ownership: Effect of information asymmetry

This table reports estimates of coefficients of the quarterly time-series cross-sectional firm-level regression of one-quarter-ahead returns on levels of and changes in total institutional ownership (*IO*), domestic institutional ownership (*IO_DOM*), and foreign institutional ownership (*IO_FOR*) and other firm characteristics (coefficients not shown). Stocks are divided into two subsamples for each characteristic indicated in the table. The low and high sample splits are based on the median of each variable. Regressions include industry, country and time dummies. Refer to Table A1 in Appendix A for variable definitions. The sample period is from 2000 to 2010. Robust t-statistics in parentheses are adjusted for clustering at the firm-level. *, **, and *** indicates significance at the 10%, 5% and 1% levels respectively.

Characteristics	Split	IO_DOM_t		IO_FOR_t		Number of observations	R-squared	Test of difference in coefficients (p-value)
Panel A: Firm characteristics								
Analyst coverage	0	0.069***	(11.31)	0.013	(0.76)	220,115	0.169	0.00
	>0	0.026***	(9.14)	0.045***	(7.93)	412,390	0.240	0.00
Volatility	Low	0.014***	(5.86)	0.029***	(5.02)	316,297	0.210	0.01
	High	0.058***	(16.02)	0.026***	(3.00)	316,208	0.233	0.00
Close	Low	0.041***	(13.91)	0.055***	(8.09)	316,301	0.212	0.05
	High	0.044***	(10.50)	0.014	(1.57)	316,204	0.207	0.00
Herfindahl	Low	-0.038*	(-1.81)	0.036**	(2.16)	267,299	0.214	0.01
	High	0.008***	(2.78)	0.020***	(2.85)	269,738	0.239	0.10
Assets	Low	0.060***	(14.45)	0.035***	(2.80)	316,146	0.200	0.05
	High	0.021***	(7.10)	0.025***	(4.29)	316,343	0.235	0.58
Book-to-market	Low	0.053***	(18.07)	0.027***	(4.01)	316,230	0.215	0.00
	High	0.020***	(5.51)	0.035***	(3.85)	316,275	0.202	0.13
Illiquidity (zero return)	Low	0.036***	(11.98)	0.042***	(6.51)	312,029	0.240	0.40
	High	0.064***	(11.50)	0.012	(1.14)	310,932	0.191	0.00
Panel B: Market condition								
Bull/Bear	Bull	0.026***	(9.68)	0.041***	(6.52)	442,342	0.178	0.02
	Bear	0.068***	(15.82)	-0.028**	(-2.47)	190,163	0.183	0.00
Stress	No	0.037***	(13.93)	0.039***	(6.16)	448,450	0.113	0.79
	Yes	0.045***	(10.91)	-0.008	(-0.78)	184,055	0.299	0.00
Panel C: Country characteristics								
Disclose	Low	0.068***	(5.15)	0.033***	(3.81)	79,584	0.323	0.03
	High	0.039***	(16.40)	0.039***	(5.64)	537,625	0.199	0.99
Corruption	Low	0.040***	(16.68)	0.042***	(6.51)	484,021	0.196	0.83
	High	0.058**	(2.15)	0.008	(0.80)	133,188	0.282	0.09
Anti-Director	<4	0.038***	(3.57)	0.019**	(2.48)	151,280	0.258	0.14
	>=4	0.038***	(15.18)	0.048***	(6.30)	481,225	0.199	0.19
Geography	U.S.	0.043***	(12.94)	0.073***	(3.21)	198,595	0.185	0.19
	Non-U.S.	0.016***	(2.69)	0.015***	(2.72)	433,910	0.233	0.87

Table 8
Regression of future returns on levels of and changes in local and nonlocal institutional ownership: Effect of information asymmetry

This table reports estimates of coefficients of the quarterly time-series cross-sectional firm-level regression of one-quarter-ahead returns on levels of and changes in total institutional ownership (*IO*), domestic institutional ownership (*IO_DOM*), and foreign institutional ownership (*IO_FOR*) and other firm characteristics (coefficients not shown). Stocks are divided into two subsamples for each characteristic indicated in the table. The low and high sample splits are based on the median of each variable. Regressions include industry, country and time dummies. Refer to Table A1 in Appendix A for variable definitions. The sample period is from 2000 to 2010. Robust t-statistics in parentheses are adjusted for clustering at the firm-level. *, **, and *** indicates significance at the 10%, 5% and 1% levels respectively.

Characteristics	Split	IO_DOM_{t-1}		IO_FOR_{t-1}		Δ *IO_DOM*		Δ *IO_FOR*		Number of observations	R-squared	Test of difference in coefficients (p-value)	
												IO	Δ *IO*
Panel A: Firm characteristics													
Analyst coverage	0	0.063***	(10.42)	0.015	(0.89)	0.068***	(2.95)	-0.019	(-0.25)	217,002	0.167	0.01	0.28
	>0	0.021***	(7.27)	0.050***	(8.69)	-0.026**	(-2.11)	-0.058**	(-2.26)	403,036	0.243	0.00	0.26
Volatility	Low	0.013***	(5.37)	0.034***	(5.67)	0.013	(1.10)	-0.038	(-1.44)	310,062	0.214	0.00	0.08
	High	0.053***	(14.64)	0.033***	(3.81)	-0.008	(-0.54)	-0.068*	(-1.76)	309,976	0.233	0.02	0.15
Close	Low	0.038***	(12.76)	0.062***	(9.04)	-0.022	(-1.58)	-0.067**	(-2.01)	310,074	0.213	0.00	0.21
	High	0.039***	(9.26)	0.020**	(2.27)	0.037**	(2.07)	-0.036	(-0.87)	309,964	0.209	0.05	0.11
Herfindahl	Low	-0.029	(-1.37)	0.054***	(3.29)	-0.024	(-0.54)	0.024	(0.35)	262,600	0.216	0.00	0.56
	High	0.005*	(1.79)	0.024***	(3.33)	-0.037***	(-3.28)	-0.095***	(-3.36)	264,968	0.242	0.01	0.06
Assets	Low	0.055***	(12.98)	0.045***	(3.49)	-0.0005	(-0.03)	-0.074*	(-1.80)	309,915	0.199	0.45	0.10
	High	0.019***	(6.60)	0.027***	(4.64)	-0.002	(-0.13)	-0.040	(-1.16)	310,107	0.239	0.25	0.31
Book-to-market	Low	0.048***	(16.40)	0.032***	(4.78)	0.007	(0.54)	-0.012	(-0.44)	310,014	0.215	0.02	0.53
	High	0.018***	(4.88)	0.044***	(4.92)	0.0004	(0.02)	-0.097*	(-1.92)	310,024	0.205	0.01	0.07
Illiquidity (zero return)	Low	0.031***	(10.41)	0.046***	(7.02)	-0.010	(-0.78)	-0.022	(-0.75)	305,893	0.243	0.04	0.72
	High	0.059***	(10.44)	0.020*	(1.87)	0.047**	(2.51)	-0.081	(-1.64)	304,602	0.192	0.00	0.02

Table 8: Continued

Characteristics	Split	IO_DOM_{t-1}		IO_FOR_{t-1}		Δ IO_DOM		Δ IO_FOR		Number of observations	R-squared	Test of difference in coefficients (p-value)	
Panel B: Market conditions													
Bull/Bear	Bull	0.027***	(10.21)	0.044***	(7.02)	-0.027**	(-2.19)	-0.029	(-0.88)	442,342	0.178	0.01	0.96
	Bear	0.055***	(12.42)	-0.013	(-1.17)	0.077***	(3.69)	-0.140***	(-3.18)	177,696	0.187	0.00	0.00
Stress	No	0.031***	(11.29)	0.045***	(6.97)	-0.007	(-0.59)	-0.015	(-0.49)	435,983	0.111	0.04	0.82
	Yes	0.046***	(11.12)	-0.002	(-0.21)	0.020	(0.99)	-0.197***	(-4.75)	184,055	0.299	0.00	0.00
Panel C: Country characteristics													
Disclose	Low	0.064***	(4.83)	0.037***	(4.14)	0.032	(0.86)	-0.044	(-1.05)	78,279	0.326	0.09	0.17
	High	0.036***	(14.92)	0.048***	(6.81)	-0.007	(-0.66)	-0.071**	(-2.05)	526,604	0.200	0.10	0.08
Corruption	Low	0.036***	(14.91)	0.049***	(7.60)	-0.020*	(-1.85)	-0.044	(-1.41)	472,892	0.198	0.05	0.47
	High	0.060**	(2.18)	0.014	(1.37)	0.145*	(1.91)	-0.048	(-0.83)	131,991	0.281	0.13	0.04
Anti-Director	<4	0.034***	(3.09)	0.024***	(3.06)	0.086***	(2.83)	-0.079**	(-2.00)	149,372	0.260	0.61	0.00
	>=4	0.033***	(13.56)	0.054***	(7.09)	-0.008	(-0.74)	-0.042	(-1.18)	470,666	0.200	0.01	0.37
Geography	U.S.	0.039***	(11.71)	0.097***	(4.17)	-0.026**	(-2.04)	-0.194***	(-3.35)	193,130	0.186	0.01	0.00
	Non-U.S.	0.015**	(2.39)	0.019***	(3.58)	0.096***	(4.55)	-0.038	(-1.27)	426,908	0.235	0.56	0.00

Table 9
Regression of future returns on levels of and changes in institutional ownership: Alternative classifications

This table reports estimates of coefficients of the quarterly time-series cross-sectional firm-level regression of one-quarter-ahead returns on levels of and changes in total institutional ownership (*IO*), domestic institutional ownership (*IO_DOM*), and foreign institutional ownership (*IO_FOR*) and other firm characteristics (coefficients not shown). Panel A reports the results for institutional ownership based on the geographical region (same/different) where the stock and the institution. Panel B reports the results for institutional ownership based on the distance between the capital city where the firm and institution are domiciled using a threshold of 1,000 km. Regressions include industry, country and time dummies. Refer to Table A1 in Appendix A for variable definitions. The sample period is from 2000 to 2010. Robust t-statistics in parentheses are adjusted for clustering at the firm-level. *, **, and *** indicates significance at the 10%, 5% and 1% levels respectively.

Panel A: Same and different region						
	(1)	(2)	(3)	(4)	(5)	(6)
IO_SAME_{t}	0.039***				0.039***	
	(17.44)				(17.74)	
IO_SAME_{t-1}		0.035***				0.036***
		(15.85)				(16.24)
Δ *IO_SAME*		-0.008				-0.007
		(-0.73)				(-0.63)
IO_DIFF_{t}			0.029***		0.040***	
			(3.98)		(5.34)	
IO_DIFF_{t-1}				0.038***		0.047***
				(5.10)		(6.34)
Δ *IO_DIFF*				-0.053		-0.049
				(-1.36)		(-1.27)
Number of observations	632,505	620,038	632,505	620,038	632,505	620,038
R-squared	0.207	0.208	0.206	0.208	0.207	0.208
Test-of-difference in coefficients (p-values) between:						
IO_SAME = IO_DIFF					0.97	0.15
Δ *IO_SAME* = Δ *IO_DIFF*						0.29

Table 9: Continued

Panel B: Local and distant						
	(1)	(2)	(3)	(4)	(5)	(6)
IO_LOCAL_{t}	0.038***				0.040***	
	(17.31)				(17.76)	
IO_LOCAL_{t-1}		0.035***				0.036***
		(15.68)				(16.24)
Δ *IO_ LOCAL*		-0.008				-0.007
		(-0.80)				(-0.69)
$IO\_DISTANT_{t}$			0.023***		0.037***	
			(3.73)		(5.80)	
$IO\_DISTANT_{t-1}$				0.031***		0.043***
				(4.88)		(6.76)
Δ *IO_ DISTANT*				-0.042		-0.037
				(-1.28)		(-1.12)
Number of observations	632,505	620,038	632,505	620,038	632,505	620,038
R-squared	0.207	0.208	0.206	0.208	0.207	0.208
Test-of-difference in coefficients (p-values) between:						
IO_LOCAL = IO_DISTANT					0.68	0.29
Δ *IO_LOCAL =* Δ *IO_DISTANT*						0.39

Table 10
Robustness tests

This table reports estimates of coefficients of the quarterly time-series cross-sectional firm-level regression of one-quarter-ahead returns on levels of and changes in total institutional ownership (*IO*), domestic institutional ownership (*IO_DOM*), and foreign institutional ownership (*IO_FOR*) and other firm characteristics (coefficients not shown). Panel A reports Fama-MacBeth regressions with robust t-statistics adjusted for autocorrelation with Newey-West standard errors using four lags. Panel B reports regressions with standard errors adjusted for clustering at the country level. Panel C reports regressions with standard errors adjusted for two-way clustering at the stock- and quarter-level. Regressions include industry, country and time dummies. Refer to Table A1 in Appendix A for variable definitions. The sample period is from 2000 to 2010. Robust t-statistics in parentheses are adjusted for clustering at the firm-level. *, **, and *** indicates significance at the 10%, 5% and 1% levels respectively.

Panel A: Fama-MacBeth								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IO_t	0.034***							
	(2.98)							
IO_{t-1}		0.032***						
		(3.30)						
Δ *IO*		-0.025*						
		(-1.97)						
IO_DOM_t			0.037***				0.037***	
			(3.02)				(3.05)	
IO_DOM_{t-1}				0.035***				0.035***
				(3.27)				(3.30)
Δ *IO_DOM*				-0.020				-0.020
				(-1.42)				(-1.42)
IO_FOR_t					0.005		0.011	
					(0.33)		(0.84)	
IO_FOR_{t-1}						0.005		0.011
						(0.34)		(0.88)
Δ *IO_FOR*						-0.038		-0.033
						(-0.81)		(-0.71)
Number of observations	632,505	620,038	632,505	620,038	632,505	620,038	632,505	620,038
R-squared	0.176	0.175	0.177	0.175	0.175	0.174	0.177	0.176
Test-of-difference in coefficients (p-values) between:								
IO_DOM = IO_FOR							0.15	0.16
Δ *IO_DOM* = Δ *IO_FOR*								0.79

Table 10: Continued

Panel B: Standard errors clustered by country								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IO_t	0.040***							
	(6.70)							
IO_{t-1}		0.037***						
		(7.15)						
Δ IO		-0.011						
		(-0.59)						
IO_DOM_t			0.039***				0.041***	
			(7.26)				(7.35)	
IO_DOM_{t-1}				0.035***				0.037***
				(7.08)				(7.27)
Δ IO_DOM				-0.004				-0.003
				(-0.16)				(-0.11)
IO_FOR_t					0.021*		0.031**	
					(1.97)		(2.07)	
IO_FOR_{t-1}						0.028**		0.038**
						(2.28)		(2.27)
Δ IO_FOR						-0.059*		-0.055*
						(-1.90)		(-1.84)
Number of observations	632,505	620,038	632,505	620,038	632,505	620,038	632,505	620,038
R-squared	0.207	0.208	0.207	0.208	0.206	0.208	0.207	0.208
Test-of-difference in coefficients (p-values) between:								
IO_DOM = IO_FOR							0.51	0.96
Δ IO_DOM = Δ IO_FOR								0.05

Table 10: Continued

Panel C: Standard errors clustered by firm and quarter								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IO_t	0.040***							
	(4.02)							
IO_{t-1}		0.037***						
		(3.99)						
Δ IO		-0.011						
		(-0.50)						
IO_DOM_t			0.039***				0.041***	
			(3.44)				(3.59)	
IO_DOM_{t-1}				0.035***				0.037***
				(3.34)				(3.52)
Δ IO_DOM				-0.004				-0.003
				(-0.15)				(-0.11)
IO_FOR_t					0.021		0.031*	
					(1.20)		(1.89)	
IO_FOR_{t-1}						0.028		0.038**
						(1.59)		(2.21)
Δ IO_FOR						-0.059		-0.055
						(-1.35)		(-1.27)
Number of observations	632,505	620,038	632,505	620,038	632,505	620,038	632,505	620,038
R-squared	0.207	0.208	0.207	0.208	0.206	0.208	0.207	0.208
Test-of-difference in coefficients (p-values) between:								
IO_DOM = IO_FOR							0.67	0.97
Δ IO_DOM = Δ IO_FOR								0.28

Figure 1
Domestic and foreign institutional ownership

This figure shows the average institutional ownership by foreign and domestic institutions by country at the end of 2010. Domestic (foreign) institutional ownership is the sum of the holdings of all institutions domiciled in the same country (in a different country) in which the stock is listed, as a fraction of its year-end market capitalization.

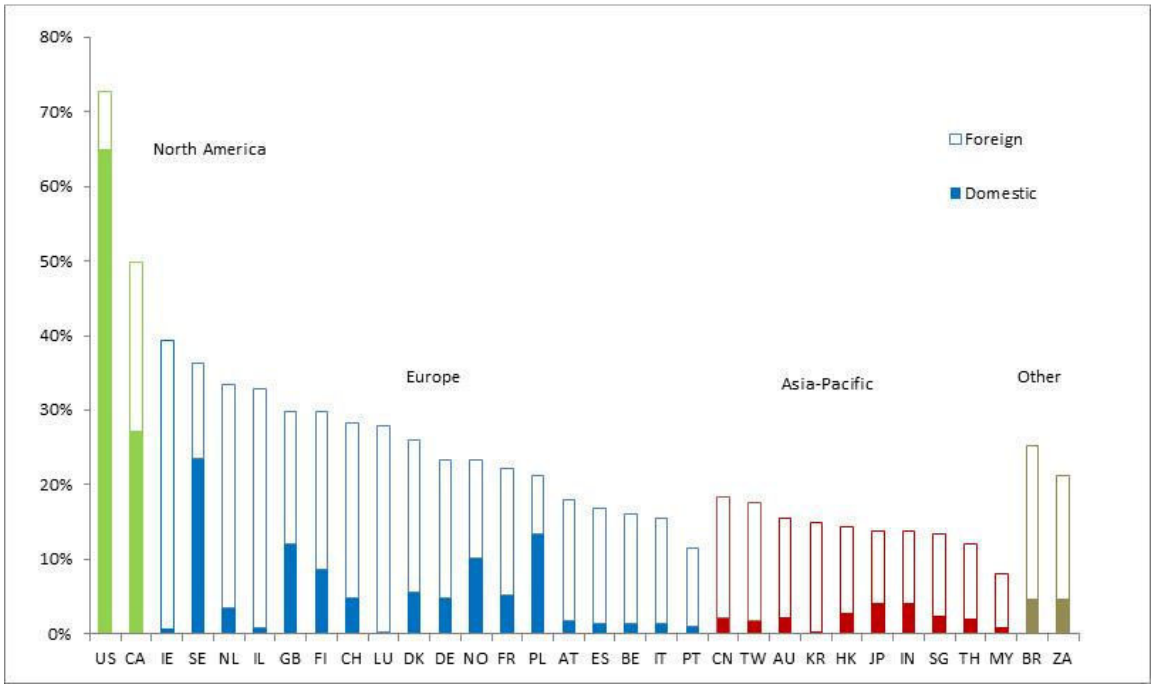

Table A1: Variables definition

Variable	Definition
RET	Quarterly stock return in US$ (Datastream item RI ($)).
IO	Institutional ownership by all institutions as a percentage of market capitalization.
IO_DOM	Institutional ownership by domestic institutions as a percentage of market capitalization.
IO_FOR	Institutional ownership by foreign institutions as a percentage of market capitalization.
IO_SAME_REG	Institutional ownership by institutions sharing the same geographic region as a percentage of market capitalization.
IO_DIFF_REG	Institutional ownership by institutions not sharing the same geographic region as a percentage of market capitalization.
IO_LOCAL	Institutional ownership by local (< 1000 kms) institutions as a percentage of market capitalization.
IO_DISTANT	Institutional ownership by distant (>= 1000 kms) institutions as a percentage of market capitalization.
BM	Log of the book-to-market equity ratio (market value is WorldScope item 08001 and book value is WorldScope item 03501).
SIZE	Log market capitalization in US$ (Datastream item MV).
VOL	Return volatility estimated for US dollar monthly returns.
TURN	Ratio of share volume (Datastream item UVO) by the shares outstanding (Datastream item NOSH).
PRICE	Log of the stock price (WorldScope item 05001).
MSCI	MSCI member dummy, which equals one if a firm is in the MSCI All-Country World Index.
MOM	12-month trailing stock return in US$.
DY	Dividend yield (WorldScope item 04551 divided by WorldScope item 08001).
ADR	ADR dummy, which equals one if a firm is cross-listed on a U.S. exchange.
ANALYSTS	Number of analysts covering a firm as reported by IBES.
FXSALES	International annual net sales as a proportion of net sales (WorldScope item 08731).
CLOSE	Number of shares held by insiders as a proportion of the number of shares outstanding (WorldScope item 08021).
ASSETS	Assets in US$ (WorldScope item 02999).
ILLIQ	Illiquidity measure computed as the number of daily returns in local currency that are zero divided by the number of observations in each year.
HERF	Ownership concentration ratio - Herfindahl-Hirschman index.
BULL	Market condition dummy, which equals one during bull markets.
VIX	CBOE market volatility index (VXO index).
STRESS	Uncertainty dummy, which equals one in quarters during which the VIX index exceeded (was below) its 75th percentile.
ANTI_DIRECTOR	Anti-director rights multiplied by the rule of law index (La Porta, Lopez-de-Silanes, Shleifer,and Vishny (1998)).
DISC	Accounting transparency index (Global Competitiveness Report).
CORRUPTION	Corruption index (Global Competitiveness Report).

Internet Appendix for

"Do Locals Know Better?

A Comparison of the Performance of Local and Foreign Institutional Investors"

Table IA.1
Portfolio tests: Alternative measures of ownership

This table shows value-weighted returns on the portfolios of domestic and foreign institutional holdings using alternative measures of ownership based on the geographical region (same/different) and on the distance between the capital city where the firm and institution are domiciled using a threshold of 1,000 km. The average monthly return in excess of the risk-free rate, and the average return after subtracting from each stock the return on a portfolio with similar size, book-to-market, and momentum are shown in Panel A and Panel B, respectively. The sample period is from 2000 to 2010.

Panel A: Excess Return

Country	Same Region	Different Region	Difference t-statistic	Close Investors (<1000 km)	Distant Investors (>1000 km)	Difference t-statistic
Australia	1.07%	1.51%	-2.27	1.27%	1.45%	-1.00
Austria	0.20%	0.93%	-2.25	0.72%	0.75%	-0.20
Belgium	0.28%	0.42%	-0.92	0.28%	0.40%	-0.95
Brazil	1.85%	1.83%	0.15	1.92%	1.84%	0.25
Canada	0.62%	0.58%	0.24	0.62%	0.58%	0.24
China	0.98%	0.67%	1.42	1.52%	0.90%	1.47
Denmark	0.91%	1.01%	-0.41	0.91%	0.99%	-0.33
Finland	0.04%	-0.23%	1.14	0.33%	-0.18%	1.35
France	0.25%	0.27%	-0.38	0.26%	0.26%	-0.12
Germany	0.24%	0.24%	-0.06	0.24%	0.23%	0.21
Hong Kong	0.80%	0.64%	1.54	0.84%	0.64%	1.67
India	1.59%	1.23%	1.45	1.55%	1.31%	1.33
Ireland	0.13%	-0.07%	0.61	0.31%	-0.11%	1.31
Israel	-0.24%	0.24%	-1.05	-0.51%	-0.73%	0.23
Italy	-0.03%	0.17%	-2.50	0.17%	0.08%	0.82
Japan	-0.34%	-0.34%	0.01	-0.34%	-0.34%	0.05
Korea (South)	1.18%	0.93%	1.00	1.16%	0.91%	1.62
Luxembourg	0.45%	0.43%	0.04	0.33%	0.44%	-0.30
Malaysia	0.69%	0.83%	-2.01	0.66%	0.82%	-1.92
Netherlands	0.19%	0.34%	-1.38	0.19%	0.33%	-1.46
Norway	1.04%	1.23%	-1.14	1.27%	1.20%	0.49
Poland	0.87%	1.03%	-0.93	0.81%	0.99%	-1.18
Portugal	0.32%	0.41%	-0.66	0.41%	0.56%	-0.60
Singapore	0.87%	0.39%	0.78	0.67%	0.43%	0.44
South Africa	1.67%	1.59%	0.19	1.67%	1.59%	0.19
Spain	0.42%	0.43%	-0.11	0.59%	0.52%	0.66
Sweden	0.42%	0.21%	1.36	0.40%	0.25%	1.20
Switzerland	0.44%	0.36%	0.92	0.44%	0.37%	0.88
Taiwan	0.26%	0.33%	-0.35	2.31%	2.39%	-0.37
Thailand	1.60%	1.58%	0.29	1.75%	1.81%	-0.54
United Kingdom	0.15%	0.14%	0.15	0.12%	0.14%	-0.16
United States	0.04%	-0.06%	2.22	0.04%	-0.06%	2.22
All countries	0.11%	0.13%	-0.13	0.10%	0.17%	-0.46

Table IA.1: Continued

Panel B: Characteristics-adjusted return

Country	Same Region	Different Region	Difference t-statistic	Close Investors (<1000 km)	Distant Investors (>1000 km)	Difference t-statistic
Australia	0.07%	0.38%	-1.90	0.11%	0.35%	-1.42
Austria	-0.75%	-0.41%	-2.18	-0.74%	-0.50%	-2.07
Belgium	-1.03%	-0.89%	-0.96	-1.04%	-0.92%	-0.93
Brazil	0.39%	0.36%	0.20	0.43%	0.38%	0.28
Canada	-0.24%	-0.31%	0.52	-0.24%	-0.31%	0.52
China	-0.67%	-0.73%	0.26	-0.27%	-0.76%	1.08
Denmark	-0.76%	-0.24%	-2.69	-0.78%	-0.27%	-2.82
Finland	-0.99%	-1.26%	1.12	-0.76%	-1.21%	1.25
France	-0.77%	-0.78%	0.30	-0.76%	-0.79%	0.53
Germany	-0.87%	-0.73%	-2.51	-0.88%	-0.75%	-2.47
Hong Kong	-0.46%	-0.57%	1.18	-0.45%	-0.56%	1.07
India	0.16%	0.16%	0.02	0.16%	0.17%	-0.05
Ireland	-1.19%	-1.62%	1.07	-1.01%	-1.63%	1.67
Israel	-0.90%	-0.54%	-0.98	-2.46%	-1.33%	-1.18
Italy	-0.93%	-0.90%	-0.35	-0.91%	-0.91%	0.04
Japan	-1.07%	-1.02%	-0.66	-1.08%	-1.02%	-0.71
Korea (South)	-0.45%	-0.18%	-1.15	-0.16%	-0.18%	0.09
Luxembourg	-0.66%	-0.53%	-0.31	-0.72%	-0.53%	-0.45
Malaysia	-0.29%	-0.05%	-3.22	-0.37%	-0.06%	-3.63
Netherlands	-0.82%	-0.55%	-2.61	-0.81%	-0.57%	-2.61
Norway	-0.60%	-0.34%	-1.59	-0.63%	-0.39%	-1.66
Poland	-0.85%	-0.44%	-2.50	-0.94%	-0.46%	-3.04
Portugal	-0.60%	-0.32%	-1.68	-0.93%	-0.44%	-1.73
Singapore	-0.52%	-0.80%	0.52	-0.59%	-0.78%	0.37
South Africa	0.14%	0.33%	-0.50	0.14%	0.33%	-0.50
Spain	-0.59%	-0.52%	-0.95	-0.60%	-0.56%	-0.40
Sweden	-0.44%	-0.44%	-0.06	-0.45%	-0.43%	-0.14
Switzerland	-0.42%	-0.40%	-0.29	-0.42%	-0.40%	-0.47
Taiwan	-0.71%	-0.44%	-1.48	-0.23%	0.13%	-1.95
Thailand	0.39%	0.41%	-0.27	0.08%	0.43%	-3.37
United Kingdom	-0.88%	-0.76%	-1.41	-0.89%	-0.77%	-1.40
United States	-0.78%	-0.81%	0.99	-0.78%	-0.81%	0.99
All countries	-0.76%	-0.72%	-0.33	-0.76%	-0.71%	-0.43

Chapter II

Are Foreign Investors Locusts?

The Long-Term Effects of Foreign Institutional Ownership[*]

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"We support those companies, who act in interest of their future and in interest of their employees against irresponsible locust swarms, who measure success in quarterly intervals, suck off substance and let companies die once they have eaten them away."

Franz Müntefering, 2005, German Social Democratic Party Chairman

1. Introduction

How does financial globalization affect long-term corporate investment and productivity? Over the last decade, there has been a trend away from the "stakeholder capitalism" and concentrated ownership model, historically predominant in continental Europe and Japan, which promoted long-term relationships with labor, creditors, and other stakeholders. In its place, many companies worldwide are moving towards the Anglo-Saxon "shareholder capitalism" model (Tirole (2001), Carlin and Mayer (2003), Allen, Carletti, and Marquez (2013)) with a dispersed and globalized shareholder structure. The agents bringing about this change are foreign institutional investors who increasingly play a significant role as shareholders of corporations worldwide (Aggarwal, Erel, Ferreira, and Matos (2011)).

Many analysts and policy makers fear that pressure from foreign institutions may lead to managerial short-termism, undermining reinvestment of profits into fixed capital, research and development (R&D), and human capital. Success in technological innovation is a driving force of corporate success and growth in the long-run. However, investing in new technologies, products, and services is risky and challenging, and requires both managerial effort and shareholder engagement to bear these risks and tolerate failure. Alternatively, foreign portfolio investors may help to mitigate managerial entrenchment, making managers more willing to act in the interests of shareholders and to exploit growth opportunities by ramping up long-term investment and innovation efforts.

We entertain two hypotheses. The first hypothesis is that the presence of foreign institutional

investors as shareholders may lead managers to cut long-term investment by reducing capital expenditures, R&D and employment. This view argues that foreign portfolio flows are "hot money" in search of short-term profits and have no concern about the long-term prospects of the firm.[1] Franz Müntefering, German Social Democratic Party Chairman, made the front page of newspapers when, at his party's convention, compared foreign (mostly Anglo-Saxon) investors with an invasion of "locusts" stripping companies bare (see quote at the beginning of the paper).[2] This stance against foreign investors is part of a more general phenomenon of protectionism towards foreign capital flows. Dinc and Erel (2013) find evidence of economic nationalism in mergers and acquisitions in Europe where governments prefer that target companies remain in domestic hands.

Foreign institutional investors may induce a short-term bias by increasing managerial focus on efficiency-seeking strategies that help short-term earnings at the cost of long-term investing. Ferreira, Manso, and Silva (2014) argue that the stock market pressures corporate managers to select incremental projects that are easier to communicate to investors.[3] Managers may then forgo innovation and try instead to acquire ready-made technologies as this strategy is more transparent to the stock market. Moreover, foreign institutions may be less failure-tolerant and thus increase the risk of executives being fired, which could lead to career concerns. These factors may dissuade risk-averse managers from pursuing growth opportunities by innovating.[4]

The second hypothesis is that foreign institutional investors promote long-term investment in

[1] Brennan and Cao (1997) argue that foreign investors, less informed about the prospects of local stocks, may react more strongly rebalancing their portfolios and amplify the stock reaction to negative public news.
[2] See also "German Deputy Still Targets Locusts", *Financial Times*, February 14, 2007.
[3] Stock markets have been criticized for providing incentives for managers to pursue short-term performance at the expenses of long-term value. See Stein (1988, 1989) for a more general discussion of investor myopia on optimal managerial decision-making when facing irrational stock markets. Asker, Farre-Mensa, and Ljungqvist (2015) show that short termism distort investment and innovation decisions of publicly-listed firms.
[4] There are also wider implications as the investment of scarce corporate resources in innovation activities may have positive spill-overs to the local economy and governments may have a preference to promote "national champions" in innovation.

fixed capital, innovation, and human capital. Large institutions may be better at monitoring managers and influencing strategic decision making. This positive impact derives from the disciplinary effect of institutions on "lazy" managers. Additionally, large portfolio investors are more sophisticated and may be better able to tolerate the high risk/high return trade-off of long-term investment as they have the ability to diversify these risks across their international portfolios. The presence of institutions may also boost investment and innovation activities by increasing tolerance for failure and reducing managers' career concerns.

A recent study by Aghion, Van Reenen, and Zingales (2013) finds a positive impact of institutional ownership on innovation in U.S. firms by reducing career concerns rather than by reducing managerial entrenchment. They show that the relation between institutional ownership and innovation is more pronounced when product market competition is more intense and CEOs are less entrenched. Furthermore, CEO turnover is less sensitive to poor performance when institutional ownership is high. Bushee (1998) finds that U.S. firms with greater institutional ownership are less likely to cut R&D investment in order to reverse a decline in earnings.[5] Harford, Kecskes and Mansi (2015) find that long-term institutional investors monitor corporate managers and encourage corporate policy decisions that increase shareholder value.

There are reasons to believe that the channel by which institutional ownership fosters long-term investment is different outside of the United States. Domestic institutional investors, because they are more likely to have business ties with local corporations, may have less of an arm's-length relation with invested firms. Domestic institutions may be affiliated with local banks that act as creditors, have board seats, or sell other services to firms (e.g., underwriting or

[5] In related evidence, Francis and Smith (1995) find a positive relation between institutional ownership concentration and R&D expenditures. In terms of private equity investors, Lerner, Sorensen, and Stromberg (2011) find that LBO targets do not cut on patenting activity, and Boucly, Sraer, and Thesmar (2011) find that LBO targets become more profitable and grow faster.

advising). This implies that domestic institutional money managers may be more sympathetic to incumbent management and can act less as external monitors (Gillan and Starks (2003), Ferreira and Matos (2008)). Management and controlling shareholders are likely to pursue their own interests at the expense of outside investors (Stulz (2005)).[6] In contrast, foreign institutions are less encumbered by ties with management, and so these owners can promote investment in riskier growth opportunities. Foreign institutional investors can act in the interest of shareholders either through "voice" (e.g., using quiet diplomacy to persuade management, vote their shares, or trigger confrontational proxy fights) or by threatening to "exit" (e.g., selling and depressing stock prices which can hurt managers). Consistent with this idea, Aggarwal, Erel, Ferreira, and Matos (2011) show that international portfolio investments promote better corporate governance that align the interests of shareholders and increase CEO-turnover performance sensitivity.

To test these hypotheses, we use a panel data set of portfolio equity holdings by institutional investors covering over 30,000 publicly-listed firms across 30 countries over the 2001-2010 period. We find a robust positive association between foreign institutional ownership and long-term investment as proxied by R&D plus capital expenditures (scaled by assets), as well as between foreign institutional ownership and innovation output (as measured by patent counts). The effect is both statistically and economically significant. A ten percentage point increase in foreign institutional ownership is associated with a 0.4% increase in long-term investment (nearly one-tenth of the median ratio) and a 6% increase in patent counts.

An important concern with our results is that foreign institutional ownership is endogenously determined. More innovative firms are likely to attract portfolio investment from foreign

[6] This hypothesis builds on evidence that domestic institutions tend to be more conflicted. Several markets have witnessed the development of "independent" domestic institutions. For example, Giannetti and Laeven (2009) document that a Swedish reform of pension system increased investor monitoring, but only by independent private pension funds. More generally, Beck, Levine, and Loayza (2000) document a positive relation between the level of financial intermediation development and capital investments.

institutions and this could explain the positive association with long-term investment. We address this concern using instrumental variable methods. We use the addition of a stock to the Morgan Stanley Capital International (MSCI) All Country World Index, the most commonly used international stock benchmark, as an instrumental variable for foreign institutional ownership. A stock in the MSCI is more likely to be owned by foreign institutions as their portfolios are typically benchmarked against this index. The identification assumption is that the addition to the MSCI is uncorrelated with a firm's long-term investment and innovation output, except through foreign institutional ownership. Differences-in-differences estimates show that the exogenous increase in foreign institutional ownership that follows the addition of a stock to the MSCI has a positive effect on long-term investment and innovation output, suggesting that these findings are causal and not due to self-selection. Importantly, we find the opposite effect following the deletion of a stock from the MSCI.

Firms located in countries with weaker investor protection (civil-law countries) are likely to benefit more from the monitoring effects of international institutional investment (Agarwal, Erel, Ferreira, and Matos (2011)). Consistent with this idea, we find that the relation is stronger in firms located in civil-law countries. We also differentiate among institutions on the basis of their legal origin, business ties to firms, and investment horizon. We find that U.S. institutions, and more generally those institutions based in common-law countries, are associated with higher innovation output, while institutions from civil-law countries are not. Furthermore, our analysis shows that independent institutions (mutual fund managers and investment advisers) that are unlikely to have business ties with the invested firm are also the main drivers of innovation in civil-law countries, rather than non-independent institutions (bank trusts and insurance companies). Finally, the characterization of foreign investors as "locusts" blends the idea of both

their alien nature and their myopic behavior. Therefore, we control for investor horizon as proxied by the investors' portfolio turnover (Gaspar, Massa, and Matos (2005), Harford, Kecskes and Mansi (2015)). We show that the effect of foreign institutional ownership is distinct from the pure effect of shareholder horizons as proxied by the investors' portfolio turnover (Gaspar, Massa, and Matos (2005)). We find a positive association between long-term foreign institutional ownership and innovation, which is consistent with the evidence of Bushee (1998) and Aghion, Van Reenen, and Zingales (2013) for long-term domestic institutional ownership in U.S. firms.

Next, we investigate the channel through which foreign institutions enhance long-term investment and innovation output: career concerns or monitoring efforts. Consistent with the monitoring hypothesis, we find that the positive relation between long-term investment and innovation output and foreign institutional ownership is stronger when firms have weaker corporate governance (i.e., managers are more entrenched), product market competition is less intense, and firms are less financially constrained. If corporate governance standards and competition is low, then there is more need for intensive monitoring by foreign institutions as managers are not disciplined by other mechanisms such as board monitoring and the threat of bankruptcy or takeover; the career concern channel has the reverse predictions. Furthermore, we show that the decision to fire the CEO is more affected by poor stock market or accounting performance when foreign institutional ownership is higher. The evidence also does not support the hypothesis that institutional investors relax financial constraints as we show that our results are stronger in less financially constrained firms. Overall, these findings suggest that foreign institutions act as effective monitors forcing managers to pursue more innovative projects instead of enjoying a "quiet life" (Bertrand and Mullainathan (2003)). The evidence differs from the career concern channel that explains the role of domestic institutions in U.S. corporate

innovation in Aghion, Van Reenen, and Zingales (2013). This is explained by the fact that domestic institutions represent the large majority of institutional ownership in U.S. firms. Indeed, we find that the role of domestic and foreign institutions in promoting innovation differs in common-law (such as the U.S.) versus civil-law countries.

Finally, while foreign institutional ownership may be positively related to both fixed and intangible capital formation we address the concern that it could have negative externalities to labor. The concern from local politicians is that "locust" foreign capital might lead not just to "asset stripping" but also to labor-unfriendly policies, namely employee layoffs. However, our results show that foreign institutional ownership is positively and significantly associated with increases in employment, wages, and selling, general and administrative expenses (SG&A). Therefore, we conclude that foreign capital is also positively linked to human capital formation and organizational capital. Furthermore, foreign institutional ownership is associated with increases in total factor productivity and, specifically, to foreign operations. Finally, we show that larger foreign institutional ownership is associated with higher shareholder value as proxied by Tobin's Q.

Our paper contributes to the literature by studying the role of cross-border portfolio flows for long-term investment, innovation, and productivity. Our evidence challenges the conventional wisdom that foreign investors are associated with reductions in long-term investment which leads to value destruction. In contrast, we find that foreign institutional investors promote long-term investment and enhance productivity and value. This paper also contributes to the literature on the role of different stakeholders in the innovation process, such as blockholders, creditors, and workers. Using country-level data, Acharya, Baghai, and Subramanian (2013) show that employee-friendly laws (stringent laws governing the dismissal of employees) promote

innovation, and Acharya and Subramanian (2009) show that creditor-friendly bankruptcy codes hinder innovation. Hsu, Tian, and Xu (2014) show that equity market development positively affects aggregate innovation levels. Guadalupe, Kuzmina, and Thomas (2012) show that foreign direct investment (FDI) has a positive impact on innovation in local firms, typically through a direct technology and know-how transfer associated with controlling stakes.

2. Data and Variables

The initial sample includes all publicly-listed firms in the Worldscope database in the 2001-2010 period. We exclude financial firms (SIC codes 6000-6999) and utilities (SIC codes 4900-4999) because these tend to be regulated. We restrict the sample to firms based in the 30 countries whose publicly-listed firms have, in total, at least 10 patents granted over the sample period and also $10 billion of total stock market capitalization (as of 2009). Table 1, Panel A, groups countries into four geographical regions: North America, Europe, Asia Pacific, and Other. Panel A of Table 1 shows that the total number of firms consists of 30,952 unique firms for a total of 181,173 firm-year observations.

2.1. Long-Term Investment

The first component of long-term investment measure is the capital expenditures to assets ratio (*CAPEX*). Panel A of Table 1 shows that close to $16.3 trillion was collectively invested in fixed capital by the sample firms over the 2001-2010 period. U.S. firms and non-U.S. firms have similar average CAPEX ratios at around 5%. Panel A of Figure 1 shows it is well distributed around the world and Panel A of Figure 2 shows that there has been a shift towards higher CAPEX in firms located in Asia Pacific and Other regions. Panel B of Table 1 shows that the industries with the highest capital intensity are “Energy”, followed by “Telecom”. Figure 3

shows that 7 out of the top 10 firms worldwide in CAPEX are energy firms as of 2010.

The second component of long-term investment is Research and Development (*R&D*) expenditures scaled by total assets. We set R&D to zero for firms that do not report R&D expenditures in Worldscope. There are potentially sample selection issues due to the voluntary nature of R&D disclosure since there has historically been some variation in national accounting standards. Hall and Oriani (2006) conclude that R&D disclosure standards have improved and our data shows that total R&D dollars are now well distributed across regions in the world.[7]

Panel A of Table 1 shows that close to $4.7 trillion was collectively invested in R&D by the sample firms over the 2001-2010 period. U.S. firms have the highest average R&D ratio at 5.1%, which well exceeds the average of 1.5% for non-U.S. firms. The United States also has the highest number of unique firms reporting positive R&D, but Canadian companies have the highest average R&D ratio in the sample of firms with positive R&D. While U.S. firms lead in terms of R&D intensity, the combined R&D spending of non-U.S. firms exceeded that of U.S. firms over the sample period (see also Panel B of Figure 1). Panel B of Figure 2 shows a rise in the share of R&D dollars of Asia Pacific firms from 24% to 34% of the worldwide total during the 2000s. This suggests an increase in the internationalization of corporate innovation activity. Panel B of Figure 3 illustrates the rise of Toyota and Roche as the top R&D spenders in the last years of the sample period surpassing major U.S. firms such as Ford and Pfizer.[8]

Panel B of Table 1 illustrates the R&D intensity across firms using the Fama-French 12 industry classification. The industries with the highest R&D intensity are "Healthcare" (medical

[7] International Accounting Standards "IAS 38 Intangible Assets" defines the accounting requirements for investments in creating intangible assets such as R&D. Hall and Oriani (2006)) conclude that even though reporting R&D was not required in some countries in continental Europe, in fact, a fairly large share of major R&D-doers actually reported it. In the second half of the 2000s, the move by many firms to use International Financial Reporting Standards (IFRS) improved considerably R&D reporting practices.

[8] These firm rankings are consistent with those in European Commission (2010) and Booz & Co (2013).

equipment and drugs), followed by "Business Equipment" (computers, software, and electronic equipment) and "Consumer Durables".

In our main tests, we focus on total long-term investment in both fixed and intangible capital, which we will proxy for by summing CAPEX plus R&D expenditures.

2.2. Innovation Output

We measure the output of R&D activity by the number of patents, the exclusive rights over an invention of a product or a process. Researchers have argued that patent counts are the most important measure of firms' innovation output (Griliches (1990)). While patent counts per se do not necessarily measure the economic value of patents, there is ample evidence of a positive relation between patents and firm value both in the United States (Hall, Jaffe, and Trajtenberg (2005)) and also in Europe (Hall, Thoma, and Torrisi (2007)).

We collect information from the complete set of patent grant publications issued weekly by the United States Patent and Trademark Office (USPTO) from January 1990 to June 2013. In this way, we obtain the universe of patents awarded by the USPTO to both U.S. and international companies, individuals, and other institutions. The USPTO is also the raw source for the NBER patent database developed by Hall, Jaffe, and Trajtenberg (2001) which is commonly used in prior literature. For each patent, we identify patent assignees listed on the patent grant document, the country of these assignees, and the indicator of whether each assignee is a U.S. corporation, a non-U.S. corporation, an individual or a government. Using this information, we match patents to publicly-listed firms in the Worldscope database. Our matching algorithm involves two main steps. First, we standardize patent assignee and firm names – focusing on unifying suffixes and dampening the non-informative parts of patent assignee and firm names. Second, we apply multiple fuzzy string matching techniques to identify the firm, if any, to which each patent

belongs. Using this procedure, we match 1,411,376 patents to 13,045 unique firms for patents applied in the period 1990-2010.[9] Of these patents, close to half of the assignees of the patents are foreign corporations. In the Internet Appendix, we offer a detailed description of the matching procedure as well as a comparison to the NBER patent matching in terms of examples of top U.S. firms (Table IA.1), total distribution of patent counts (Table IA.2), and statistics on the coverage of USPTO patents by country (Table IA.3).

There are several reasons to focus on USPTO patents to measure innovation output in our international setting. First, we follow the commonly used approach to calculate patent indicators based on information from the most important patent office, the USPTO. Patent regulations (on the scope of patent protection) and practices followed by patent offices (processing and publishing of patent filing documents) in different countries may not be fully compatible. This makes the aggregation of patent statistics difficult across different patent offices and over time.

Second, for non-U.S. firms, patents in the sample arguably reflect relatively more important innovations as these firms are willing to accept additional costs of patenting in the United States. Therefore, we address the common criticism that there is an excessive heterogeneity in the quality of patents, mainly, that there are many "useless" patents. In our regressions, we include country and year fixed effects that remove a possible "home" advantage bias by U.S. firms as well as any foreign country-level bias of applying for patents at the USPTO.

Finally, the publicly-listed firms in our sample tend to be large firms that commonly protect their innovations by simultaneously applying for patents at the USPTO, the European Patent Office (EPO), and the Japanese Patent Office (JPO). The use of USPTO patents therefore does not necessarily underestimate innovation output. However, in robustness checks we will also

[9] We stop our sample period in 2010 because of the 2 to 3-year lag between the patent application and award date. So for many patents with applications filed after December 2010, we do not know yet by the end of 2013 whether they are awarded.

examine "triadic" patents – i.e., patents applied simultaneously at the three patenting offices (USPTO, EPO, and JPO).

We use *PATENTS* as the main measure of firm-level innovation output. In the OLS regression tests, we use log(1 + *PATENTS*), which is the natural logarithm of one plus the number of patents applied by a firm in a given year. We include firms with zero patents in the analysis and assume that the patent count is zero for firms with missing USPTO information.[10] The innovation output measure is based on dates when each patent application is filed, i.e., at the point in time that is the closest to when the innovation was created. Since our institutional ownership data starts in 2000 and we lag the explanatory variables by one year, the measure of innovation spans the period 2001-2010.[11]

Panel A of Table 1 shows that the sample of firms was granted a total of 686,541 patents over the 2001-2010 period. The distribution of patent filing across countries illustrates the global nature of innovation. More than half of these USPTO patents were granted to non-U.S. firms. Japanese firms have the highest average patent count per year, surpassing even U.S. firms. The United States has the highest number of unique firms reporting positive patents, followed by Japan, Taiwan, South Korea, and Germany. Although German firms are also productive, overall, European firms filed less USPTO patents as a region than Asian or North American companies (see Panel C of Figure 1). Panel C of Figure 2 shows the geographical distribution of patents over time and illustrates that there was a significant increase in the share of patents by Asian firms from 39% to 54%. Panel C of Figure 3 illustrates the rise of Asian firms among the list of

[10] In robustness tests, we follow Bena and Li (2014) and also use patents counts by a firm in a given year, adjusted by the average number of patents in each technology class and period.

[11] USPTO patents are awarded, on average, two to three years after applications are filed. If not yet granted, the patent applications are published (i.e., revealed to public) 18 months after filing. Patents start to receive citations after they are awarded or their applications are published. Since one needs to allow at least three- to five-year window for citations to arrive, we do not use citation-weighted patents in the context of our study.

top 10 innovator firms in the second half of the sample period. In unreported results, we find a similar pattern when we study "triadic" patents filed with all three major patent offices (the EPO, JPO and the USPTO) which alleviates any bias from relying on USPTO data.

Panel B of Table 1 shows that the "Business Equipment" sector (computers, software, and electronic equipment) accounts for over 50% of all patents. It is followed by "Consumer Durables" (cars, TV's, furniture, and household appliances).[12]

2.3. Alternative Measures of Long-Term Investment

Along with investments in physical capital and R&D, firms need to make long-term investments in human capital and organizational capital. We use the log of the firm's number of employees (*EMPLOYEES*), staff costs to sales ratio (*STAFF_COSTS*), and also the log of the average staff costs per employee (*AVG_STAFF_COSTS*) to capture investment in human capital. We use the ratio of annual selling, general, and administrative expenses to total sales (*SG&A*) to capture investment in organizational capital (Eisfeldt and Papanikolau (2013)). The fear regarding "locust" foreign investors is that they may push efficiency-seeking strategies that lead firms to de-localize production and use employee layoffs as a mean to cut costs and boost performance. Both of these are potentially costly to the local economy and are typically cited by politicians for their stance against foreign portfolio investors.

2.4. Institutional Ownership

We draw institutional holdings data from the FactSet/LionShares database for the period 2000-2009. The institutions in the database are professional money managers such as mutual funds,

[12] Some scholars have argued that computer, electronics, and software patents may be applied merely to build patent portfolios for strategic reasons rather than for protection of real inventions. In robustness tests, we address this issue by using patent counts adjusted by technological class effects.

pension funds, bank trusts, and insurance companies. See Ferreira and Matos (2008) for more details on this data.

We define *IO_TOTAL* as the sum of the holdings of all institutions in a firm's stock divided by its total market capitalization at the end of each calendar year.[13] Following Gompers and Metrick (2001) and Ferreira and Matos (2008), we set institutional ownership variables to zero if a stock is not held by any institution in FactSet/LionShares.[14] We also separate total institutional ownership by the nationality of the institution. Domestic institutional ownership (*IO_DOM*) is the sum of the holdings of all institutions domiciled in the same country in which the stock is listed divided by the firm's market capitalization. Foreign institutional ownership (*IO_FOR*) is the sum of the holdings of all institutions domiciled in a country different from the one in which the stock is listed divided by the firm's market capitalization.

Panel A of Table 1 shows that the countries with the highest average total institutional ownership as of 2009 are the United States (75%), Canada (53%), Israel (48%), and Sweden (40%). The average institutional ownership is at 43% worldwide and at 23% for non-U.S. firms in our sample in 2009.[15] Despite being, on average, the minority shareholders, institutions tend to be the most influential group in terms of share of trading (effectively being the marginal investors for asset pricing purposes) and also in terms of shareholder activism (through "voice" and "threat of exit"). Aggarwal, Erel, Ferreira, and Matos (2011) show that foreign institutional investors play a role in exporting corporate governance practices outside the United States. In most countries, the holdings of foreign institutions exceed those of domestic institutions. Some exceptions are the United States, Canada, and Sweden.

[13] In calculating institutional ownership, we include ordinary shares, preferred shares, American Depositary Receipts (ADRs), Global Depositary Receipts (GDRs), and dual listings.
[14] When we repeat the empirical analysis using only firms with positive holdings, our main results are not affected.
[15] We show statistics for 2009 as our sample period ends in 2010 and we employ a one-year lag in the explanatory variables in our tests.

2.5. Firm Characteristics

We obtain firm characteristics from the Worldscope database. Table 2 shows summary statistics and Appendix A provides variable definitions and data sources. We use several firm-specific control variables in our regressions. First, we control for insider ownership, which is measured by the percentage of closely held shares (*CLOSE*). As we argued in the introduction, the interests and risk-taking incentives of blockholders are likely to diverge from those of institutional owners. Second, we control for foreign sales to total sales (*FXSALES*) since firms that sell internationally may be more likely to innovate and patent their products and services with the USPTO. For innovation output regressions, we use the same firm-level controls as in Aghion, Van Reenen, and Zingales (2013), namely the log of the ratio of capital to labor (*K/L*), the log of total sales in U.S. dollars (*SALES*), and the cumulative R&D expenditures (*R&D_STOCK*). Following Aghion, Van Reenen, and Zingales (2013), we define *R&D_STOCK* using a depreciation rate of knowledge of 15% per year. For long-term investment regressions, we also include the net property, plant, and equipment to assets ratio (*PPE*), the Tobin's Q ratio (*TOBIN_Q*), free cash-flow to assets ratio (*FCF*), debt to assets ratio (*LEVERAGE*), and cash holdings to assets ratio (*CASH*). We winsorize variables at the bottom and top 1% levels.

3. Empirical Results

In this section, we test the main hypotheses on the relation between foreign institutional ownership and measures of long-term investment and innovation output.

3.1. Long-term Investment and Innovation Output Results

Our main outcome variables are based on firm-level: (1) long-term investment (proxied by the ratio of CAPEX plus R&D expenditures to total assets); and (2) innovation output (proxied by

patent counts). We estimate regression models that include firm-level controls and country, industry, and year fixed effects. In alternative, we estimate firm fixed effects regressions that account for unobserved firm heterogeneity and address omitted variable bias.[16]

Table 3 presents results using long-term investment (*CAPEX+R&D*) as the dependent variable. Column (1) shows that total institutional ownership (*IO_TOTAL*) is only weakly positively associated with long-term investment. But, in columns (2) and (3), we split institutional investors based on their nationality relative to the firm's domicile country (*IO_FOR* and *IO_DOM*). We find that foreign institutional ownership fosters firm-level long-term investment. The effect is both statistically and economically significant. A ten percentage point increase in foreign institutional ownership is associated with a 0.4% increase in the CAPEX+R&D-to-assets ratio, which corresponds to about one-tenth of the median ratio of 4.3%. When we split institutional investors by their geographical origin in columns (2) and (3), we find that only foreign institutional ownership is positively related to long-term investment. Columns (4)-(6) confirm these results with firm fixed effects to control for time-invariant unobserved heterogeneity. In addition, we find similar results for foreign institutional ownership when we split long-term investment in its individual components: R&D and CAPEX (see Table IA.4 in the Internet Appendix).

Table 4 presents our main test focusing on patent-based measures of innovation output. The positive coefficient on *IO_TOTAL* in column (1) shows that there is a positive relation between institutional ownership and innovation output. The effect is economically significant with a ten percentage point increase in foreign institutional ownership implying a 6% increase in patent counts. We find a positive and significant effect of both foreign and domestic ownership. In

[16] In unreported results, we find that results are robust when we use firm fixed effects using the pre-sample mean scaling method proposed by Blundell, Griffith, and Van Reenen (1999).

columns (4)-(6), we confirm these findings with firm fixed effect regressions.

While foreign institutional ownership is dominant outside of the United States, domestic institutional ownership is dominant in the United States. In Table IA.5 of the Internet Appendix, we show that there is a statistically significant effect of foreign institutional ownership on both long-term investment (Panel A) and patent counts (Panel B) when we include separately non-U.S. and U.S. firms. However, the positive and significant effect of domestic ownership on patent counts is observed only in the sub-sample of U.S. firms, which is consistent with the findings of Aghion, Van Reenen and Zingales (2013).

We perform robustness checks related to the models of patent counts. Hall, Jaffe, and Trajtenberg (2001) recommend using count-based models such as a Poisson regression as alternatives to the ordinary least squares regression model. Table IA.6 in the Internet Appendix shows that our findings are robust to the use of Poisson regressions. We confirm that the positive association between institutional ownership and innovation output stems from foreign institutions. In Table IA.7 of the Internet Appendix, we check our results using "triadic" patents, i.e., patents filed with all three major patent offices (USPTO, EPO, and JPO). This addresses the potential concern that USPTO-filed patents may be especially visible or attractive to U.S.-based foreign investors and may drive U.S. foreign institutional holdings instead of the reverse. We find that our main results hold when we use only patents that are filed internationally.

3.2. Endogeneity

An important concern with our findings is that foreign institutional ownership is endogenously determined. Firms with higher investment intensity and more innovative firms may simply attract higher investment by foreign institutions and this could explain the positive association between long-term investment and foreign institutional ownership, as well as between innovation

output and foreign institutional ownership.

Our first attempt to address this concern is to use instrumental variable methods. Following Agarwal, Erel, Ferreira, and Matos (2011), we use membership in the MSCI All Country World Index as an instrument for foreign institutional ownership. We use a dummy variable (*MSCI*), which takes the value of one if a firm is a member of the MSCI in year *t*, and zero otherwise. MSCI is the most commonly used benchmark index by foreign portfolio investors. Importantly for identification purposes, domestic institutions and other investors do not usually follow this index. The exclusion restriction assumption is that MSCI membership is uncorrelated with a firm's innovation activities, except indirectly through foreign institutional ownership.

Table 5 presents the two-stage least squares (2SLS) estimates of the effect of foreign institutional ownership on long-term investment (Panel A) and innovation output (Panel B), using *MSCI* as an instrument. The first-stage regression results in columns (1) and (3) support the view that *IO_FOR* is positively associated with MSCI membership. The F-test on each first-stage regression is far above 10, which indicates that the hypothesis that the instrument can be excluded from the first-stage regressions is rejected and that the instrument is not weak. Columns (2) and (4) present the coefficients of the second-stage regression that uses either *CAPEX+R&D* (Panel A) or *PATENTS* (Panel B) as the dependent variable. The regressions show that the exogenous increase in foreign institutional ownership that follows a firm's inclusion in the MSCI has a positive effect both on long-term investment and on innovation output, suggesting that the effect of foreign institutional ownership on long-term investment and innovation output is causal and not due to selection.

An alternative approach to the instrumental variable approach is to conduct a difference-in-differences regression approach around the time that a firm's stock is added to or deleted from

the MSCI (treated firms). We employ a five-year window around the year of the index re-compositions (between year -1 and year 0). There are 574 additions to the MSCI for which we have complete institutional ownership data in the two-year period before and following the event. Similarly, there are 167 MSCI deletion events. Control firms are the nearest neighbor firms that best match treated firms, in the pre-treatment period, on multiple dimensions (*CAPEX+R&D*, *PATENTS*, *CLOSE*, *FXSALES*, *SALES*, *R&D_STOCK*, *K/L,* and *IO_FOR*) using propensity scores. Table 6 reports tests of equality of means and medians between treated and control groups. For most dimensions, we cannot reject the hypothesis of equal means or medians between treatment and control groups.

Table 7 presents the difference-in-differences regression results using the treatment/control sample introduced in Table 6. Column (1) of Table 7 Panel A shows that the difference, between the treated and control groups, in the changes of *IO_FOR* increases significantly, on average, by 2% around the addition of a firm's shares to the MSCI. In contrast, the coefficient on *IO_DOM* in column (2) is close to zero, suggesting that a firm's addition to the MSCI is indeed an exogenous instrument for foreign (but not for domestic) institutional ownership. We also find statistically significant increases both in long-term investment and innovation output (columns (3) and (4)). The results are also economically significant: the difference in the changes between treated and control groups, increases by 0.5% and by 5.4%, considering the *CAPEX+R&D*-to-assets ratio and innovation output, respectively.

Figure 4 plots the evolution of the differences between treated and control firms in the two years before and after firms' shares are added to the MSCI. A visual inspection of the figures suggests that both groups followed parallel trends in the pre-treatment period and shows a discontinuity effect following the event. Interestingly, Panel B of Table 7 and Figure 5 show that

the results are the opposite around MSCI deletion events. We find that *IO_FOR* tends to drop more than *IO_DOM* and there is a similar negative trend on *CAPEX+R&D* (although not statistically significant) and *PATENTS*.

Overall, the results of both the instrumental variable method and the difference-in-differences regression approach following MSCI additions and deletions suggest that endogeneity is unlikely to explain the positive relation between foreign institutional ownership and corporate innovation.

3.3. Monitoring and Career Concerns Channels

We have interpreted our findings of a positive causal effect of foreign institutional ownership on corporate innovation as consistent with foreign institutions reducing managerial entrenchment by exerting monitoring on managers otherwise enjoying a "quite life". Monitoring by foreign investors refers to their role in influencing management ("voice") or indirect monitoring by selling their shares ("exit" or "voting with their feet"). A possible alternative channel is that foreign institutions reduce managers' career concerns and risks and increase tolerance for failure. An implication of the monitoring channel is that the benefits of foreign institutional ownership should be felt most sharply when managers are more "entrenched", while, under the career concern channel, the impact of institutional ownership on innovation should be weaker when managers are entrenched. Managers have less ability to slack off and are more disciplined when, for example, there is more board monitoring, fewer takeover defenses, and more equity incentives in their compensation package.

To test the effect of foreign institutional ownership on innovation when corporate governance is weaker or stronger, we measure the quality of corporate governance using a firm-level index consisting of 41 governance attributes defined by Aggarwal, Erel, Stulz, and Williamson (2009) and Aggarwal, Erel, Ferreira, and Matos (2011). This is constructed using data obtained from

RiskMetrics (formerly Institutional Shareholder Services). The *GOV* index provides a firm-level governance measure that is comparable across countries and incorporates measures of board structure, anti-takeover provisions, auditor selection, compensation, and ownership structure.[17]

Table 8 reports the results. In column (1), we run a regression of *CAPEX+R&D* (Panel A) and patent counts (Panel B) including, as main explanatory variables, both foreign institutional ownership (*IO_FOR*), the governance index (*GOV*), and the interaction *IO_FOR* × *GOV*.[18] We find that foreign institutional ownership positively affects long-term investment and innovation output, controlling for corporate governance. The positive association of foreign institutional ownership is stronger when the quality of corporate governance is lower, as indicated by the negative and significant coefficient on the interaction variable *IO_FOR* × *GOV* in column (1). We conclude that the effect of foreign institutional ownership is more pronounced when managers are more entrenched. The findings are thus consistent with the monitoring channel and run contrary to the career concerns channel.

We test other alternatives to the monitoring channel. The first is institutional investors' horizon. Following Gaspar, Massa, and Matos (2005), we measure shareholder horizons using the investors' portfolio turnover (*INV_TURNOVER*). In column (2) of Table 8, we find that the effect of foreign institutional ownership on long-term investment and innovation output is more pronounced in firms with more long-term oriented shareholders. This is consistent with investor monitoring driving the effect of foreign institutional ownership on innovation.

The second alternative is product market competition. Following Aghion, Van Reenen, and

[17] *GOV* is similar in spirit to the GIM index of Gompers, Ishii, and Metrick (2003), but the scale is reversed (a higher *GOV* means more shareholder-friendly governance standards).
[18] The sample of firms in these tests is significantly smaller because of sparser coverage of the *GOV* measure, which is limited to the largest market capitalization firms in each country. More details on this governance measure are available in Aggarwal, Erel, Ferreira, and Matos (2011).

Zingales (2013), we measure *COMPETITION* as one minus the Lerner index for a given three-digit SIC industry.[19] In column (3) of Table 8, we find that the effect of foreign institutional ownership on innovation output is actually more pronounced in less competitive industries as the coefficient on *COMPETITION* × *IO_FOR* is negative. This is again consistent with the monitoring channel.

The third alternative we want to test is financial constraints. We measure financial constraints using the Kaplan-Zingales index (*KZ_INDEX*). In column (4) of Table 8, we find that the impact of foreign institutional ownership on innovation is actually stronger in firms that are less likely to be financially constrained. Finally, we test for asymmetric information using stock illiquidity measured by the *AMIHUD* ratio. In column (5) of Table 8, we find that the impact of foreign institutional ownership on both long-term investment and innovation output is stronger in less illiquid stocks, which are less likely to be subject to information asymmetry.

3.4. CEO Turnover-Performance Sensitivity

We examine whether a presence of foreign institutions affects the sensitivity of CEO turnover to performance. A prediction of the monitoring hypothesis is that higher foreign institutional ownership does not reduce, or even improves, the ability of a firm's board of directors to identify and terminate poorly performing CEOs. In contrast, the career concern hypothesis predicts that CEO turnover is less sensitive to performance in the presence of higher foreign institutional ownership.

Following Aggarwal, Erel, Ferreira, and Matos (2011), we classify a firm as having experienced a CEO turnover when the top executive at the end of the year is different from the

[19] We obtain similar estimates when we use the Lerner índex in a given country-industry or country-industry-year.

CEO at the end of the previous year using the BoardEx database.[20] To test the effect of foreign institutional ownership on CEO turnover-performance sensitivity, we use a probit model of the CEO turnover dummy variable (*CEO_TURNOVER*) on lagged abnormal stock returns (*RETURN*), lagged foreign institutional ownership (*IO_FOR*), and an interaction term of abnormal stock returns and institutional ownership (*RETURN* × *IO_FOR*). In alternative, we measure performance using the change in return on assets (ΔROA). Our coefficient of interest is the one on the interaction between *RETURN* or ΔROA and *IO_FOR*. The regression also includes the lagged domestic institutional ownership and logarithm of sales (*SALES*), as well as year, country, and industry fixed effects.[21]

Table 9 presents the results of our analysis. The interaction term in column (1) show that CEO turnover is more sensitive to low abnormal stock returns in firms with higher foreign institutional ownership. The interaction term in column (2) using accounting profitability confirms this finding. The estimated mean interaction effects (reported at the bottom of the table) are negative and statistically significant. We interpret this result to mean that firms with higher institutional ownership have a greater propensity to shed poorly performing CEOs.

These findings suggest that foreign institutions act as active monitors forcing managers to exert effort and innovate instead of enjoying a "quiet life" (Bertrand and Mullainathan (2003)). We conclude that investor monitoring by foreign portfolio investors is likely the channel through which managers are more willing to invest in innovative growth opportunities.

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[20] We cannot distinguish between voluntary and forced turnovers, but this distinction just leads to additional noise in the dependent variable, because voluntary turnovers are unlikely to be related to performance (Hermalin and Weisbach (2003)).

[21] Ai and Norton (2003) show that researchers cannot draw conclusions about the sign and the significance of the interaction term in nonlinear models (such as probit models) by examining the coefficient on the interaction term. To ensure that we draw valid inferences on the interaction variable effect, we estimate the marginal effect of the interaction variable and its significance using the delta method described by Ai and Norton (2003).

3.5. The Role of Country-Level Investor Protection

Table 10 further tests our working hypotheses that institutional investors originating from high investor protection countries (typically Anglo-Saxon countries more closely associated with "shareholder capitalism") should be particularly associated with corporate innovation. For this purpose, we split firms based on whether these are headquartered in Civil Law countries (Panel A) or Common Law countries (Panel B) based on countries' legal origin as defined in La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998). In Panel A columns (1) and (2), we find that only foreign (and especially U.S.-based) institutional investors are associated with higher innovation output in Civil Law countries. In column (3), we confirm that this result extends more broadly to common-law-based foreign investors.

We also explore other dimensions of institutional investor heterogeneity beyond their nationality and legal origin. First, we classify institutions as independent (mutual fund managers and investment advisers) that are unlikely to have business ties with the invested firms versus non-independent institutions (bank trusts and insurance companies). Aggarwal, Erel, Ferreira, and Matos (2011) show that independent institutions are the main drivers of governance improvements in firms around the world. In Panel A column (4), we find that independent institutions are positively associated with innovation output in civil-law countries, which is consistent with these institutions being more involved in monitoring corporate managers.

Finally, we split foreign institutional ownership according to institutional investor horizon. Long-term oriented investors should have lower costs and higher benefits of monitoring. Short-term investors may reduce incentives for corporate managers to invest in R&D in order to meet short-term earnings goals. For example, the Kay Review in the U.K. argues that R&D expenditure by British business had been in steady decline and that short-term incentives of asset

managers flew down to corporate managers, many of whom were incentivized "to make decisions whose immediate effects are positive even if the long run impact is not".[22] In Panel A column (5), we show that the effect of foreign institutional ownership is driven by foreign shareholders with longer investment horizons as proxied by investors' portfolio ratio (see Gaspar, Massa, and Matos (2005)).

In Panel B, we conduct the same analysis for firms headquartered in common-law countries. We find that domestic institutions have a bigger role in promoting innovation in these markets. Institutions that are based in common-law and are independent continue to be associated with fostering innovation.

3.6. Alternative Measures of Long-Term Investment

Along with investment in physical and intellectual capital, firms need to make long-term investment in human and organizational capital. The fear regarding "locust" investors is that foreign institutional investors may push firms to cut wages and to use employee layoffs as a means to cut costs and boost short-term performance. To proxy for investment in organizational capital, we use the ratio of selling, general and administrative expenses to assets (*SG&A*). To proxy for the investment in human capital, we the log of the firm's number of employees (*EMPLOYEES*), the staff costs to sales ratio (*STAFF_COSTS*), and the log of the average staff costs per employee in US$ thousands (*AVG_STAFF_COSTS*). While *EMPLOYEES* and *STAFF_COSTS* measure the level of employment and labor costs, *AVG_STAFF_COSTS* measures the relative importance of high-skill versus low-skill jobs.

The estimates in Table 11 show that foreign institutional ownership is positively associated

[22] "The Kay Review of U.K. Equity Markets and Long-Term Decision Making," U.K. Department for Business Innovation and Skills, July 2012.

with *SG&A*, *EMPLOYEES*, *STAFF_COSTS*, and *AVG_STAFF_COSTS*. We conclude that, in addition to physical and intellectual capital, foreign institutional ownership is associated with a significant increase in the other important production factor input such as human capital and organizational capital. This evidence contradicts the hypothesis of "locust" foreign capital, which potentially induces "asset stripping" and labor-unfriendly corporate policies.

3.7. Firm Productivity and Performance

So far, the evidence supports the view that, in publicly traded companies around the world, foreign institutional investors foster long-term investments leading to a higher innovation output. However, a larger quantity of innovation output does not necessarily equate to better innovation, in the sense that not all investment and innovative activities necessarily enhance shareholder value. To examine this issue, in Table 12, we carry out additional tests using several measures of productivity and performance.

In Table 12 columns (1) and (2), we examine whether foreign institutional ownership leads to the growth in products and services, particularly those that can be marked internationally. To this end, we use both *SALES* and *FXSALES* as the dependent variable. The results suggest that there is a positive effect of *IO_FOR* on total firm sales and the internationalization of firm sales. In column (3), we estimate a regression where the dependent variable is firm valuation, as measured by Tobin's Q (*TOBIN_Q*). We find that ownership by foreign institutions is positively associated with *TOBIN_Q*, unlike ownership by domestic institutions.[23] We conclude that foreign investors

[23] In unreported results, we estimate a regression where the dependent variable is *TOBIN_Q* and the main explanatory variable is log(1 + *PATENTS*) and find that the coefficient on this variable is positive and significant, indicating that a higher innovation output is positively valued by capital markets. This is consistent with findings on the market value of patent citations by Hall, Jaffe, and Trajtenberg (2005) for U.S. firms and Hall, Thoma, and Torrisi (2007) for European firms. As mentioned above, in our study, we are using recent patent data (patents applied for in the 2001-2010 period), which prevents us from using citation-weighted patents innovation output

help focus management on long-term global competitiveness encouraging them to explore potential market opportunities.

3.8. Robustness

In Table IA.8 and Table IA.9 of the Internet Appendix, we conduct several types of robustness checks on the results on long-term investment and innovation output.

In Table IA.8 of the Internet Appendix, we start with robustness checks on the long-term investment results using the specifications introduced in Table 3. Column (1) excludes the final two years of the sample period to address truncation bias concerns that arise because patents are typically granted two to three years after their applications are filed; the sample period is restricted to 2001-2008. Column (2) restricts the sample to the 2005-2010 IFRS adoption period to address any concerns that could arise due to changes in the accounting rules for R&D expenditures. Column (3) controls for country-industry-year fixed effects, which capture any country- and industry-specific time trends that we did not capture in the baseline specifications. In column (4), we use long-term investment scaled by sales instead of assets as the dependent variable. The results in these robustness tests are consistent with our main findings that foreign institutional investors actively support long-term investment in physical and intellectual capital.

In Table IA.9 of the Internet Appendix, we perform several robustness checks on the innovation output results using the specifications introduced in Table 4. We start with checks in terms of the sample definition. Column (1) shows that the results hold for the subsample of firms with positive patent counts. Column (2) excludes the final two years of the sample period to address truncation bias concerns that arise because patents are typically granted two to three

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measures, as we would need to allow for at least three- to five-year window for citations to arrive after each patent grant.

years after their applications are filed. Therefore, in this robustness test, the sample period is restricted to 2001-2008. We also conduct checks on the econometric specification. Column (3) controls for country-industry-year fixed effects, which capture any country- and industry-specific time trends that are not captured in the baseline specifications. In column (4), the dependent variable is log(*PATENTS*), therefore focusing only in the firm-year observations with non-zero patent counts.

The next set of checks deals with alternative proxies for innovation output. First, column (5) shows the results using the patent counts measure computed using a three-year window as a dependent variable. We still find a positive and significant relation between foreign institutional ownership and innovation output using this longer lens for the analysis. Column (6) estimates a model for adjusted patent counts, which accounts for unobserved factors that are common to patents' technology classes and application years. We use this alternative measure since technology classes differ in the nature of R&D activities and resources required in producing a patentable innovation, which results in patent counts in two distinct classes not being directly comparable. Additionally, there are technology class-specific time trends in the number of patents that may not fully reflect changes in innovation output over time. In particular, large increases in the number of awarded patents in some classes over time might reflect the evolution of the USPTO practices with respect to what is a patentable invention, and hence patent counts from different years may not be time-consistent measures of innovation output even within the same technology class. This is especially relevant since one industry ("Business Equipment") accounts for over 50% of all patents in our sample. The results in column (6) show that foreign institutional ownership is also positively associated with the adjusted patent counts. Finally, patents may take several years to develop so, in column (7), we use log(1 + *PATENTS*) three

years in the future and find analogous results.

To capture productivity of R&D, in column (8), we use the ratio of patent counts to R&D stock, i.e., patent counts per R&D dollars spent (*PATENTS/R&D_STOCK*). We find that there is a positive effect of foreign institutional ownership on the productivity of R&D. This finding suggests that foreign institutional ownership affects the quality and productivity of R&D rather than simply stimulating more R&D expenditure.

The results in these robustness tests are all consistent with our main findings that foreign institutional investors actively promote R&D to enable the development of new products, processes, and services.

4. Conclusion

We study the long-term effects of foreign institutional ownership using firm-level data from 30 countries in 2001-2010. We find that higher foreign institutional ownership is associated with greater long-term investment in fixed, intellectual, and human capital. Foreign institutional ownership is also positively associated with significant increases in innovation and total factor productivity, as well as shareholder value. These effects are explained by the disciplinary and monitoring roles of foreign institutions. Using the exogenous increase in foreign institutional ownership that follows the addition of a stock to the MSCI World index, we show that the effect of foreign institutional ownership on long-term investment and innovation output is causal.

Our results dismiss popular fears that portray foreign investors as predominantly interested in short-term gains often at the expense of employees. In fact, we conclude that the globalization of firms' shareholder base is a positive force for capital formation, contributing toward making firms more competitive in global markets. Since more long-term investment and innovation output may generate positive spillover to local economy, our findings have wider implications

for public policy. Instead of economic nationalism aimed at protecting "national champions" from foreign capital, our findings suggest that openness to international portfolio investment may generate positive externalities to the local economy by promoting employment and development of new technologies, products, and services.

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Figure 1
Long-Term Investment by Country

This figure shows long-term investment in terms of CAPEX in US$ billions (Panel A), R&D expenditures in US$ billions (Panel A) and number of USPTO patent filings (Panel B) by firms domiciled in each country for the total sample period from 2001 to 2010. The sample consists of Worldscope non-financial and non-utility firms.

Panel A: Capital Expenditures

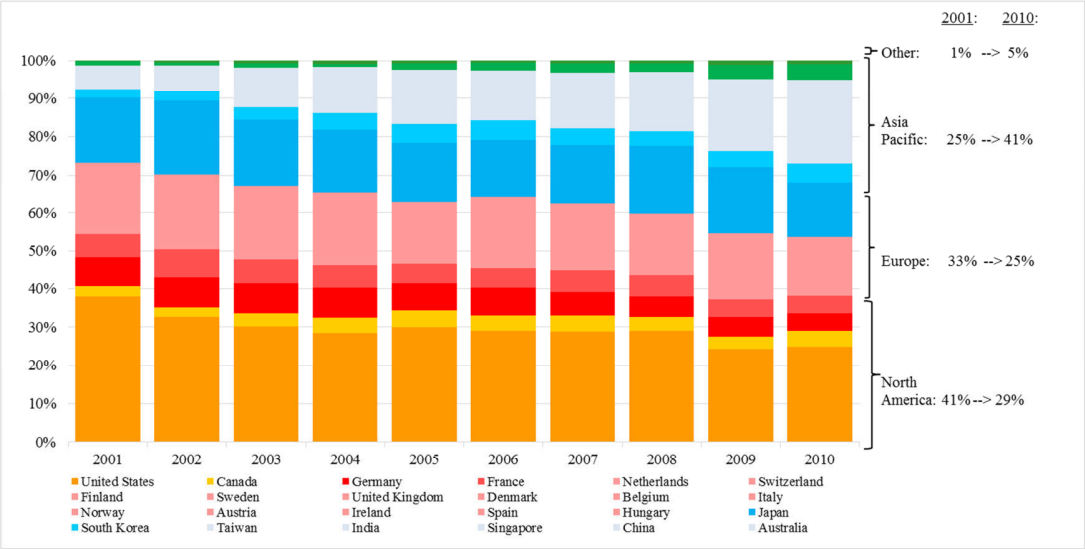
Panel B: R&D Expenditures

Panel C: Number of Patents

Figure 2
Long-Term Investment by Country and Year

This figure presents CAPEX (Panel A), R&D expenditures (Panel B) and the number of patents applied with the USPTO (Panel C) in each country as a percentage of the worldwide total in each year. The sample consists of Worldscope non-financial and non-utility firms in the 2001-2010 period. Bars are colored by geographical region (North America in orange, Europe in red, Asia-Pacific in blue, and Other in green).

Panel A: Percent of Capital Expenditures



Panel B: Percent of R&D Expenditures

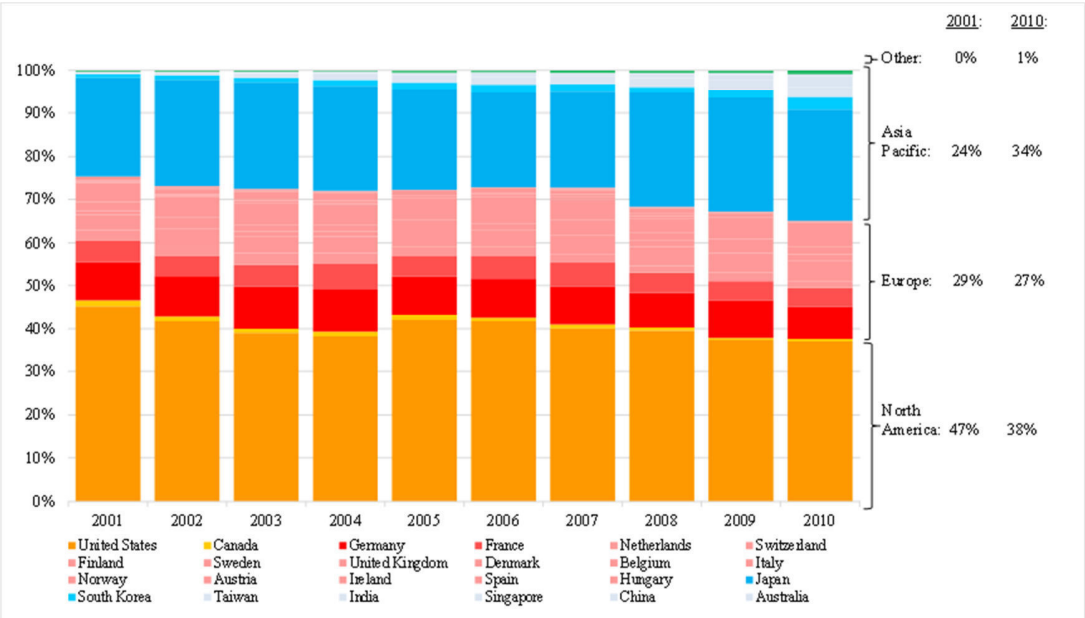


Figure 2 (continued)

Panel C: Percent of Number of Patents

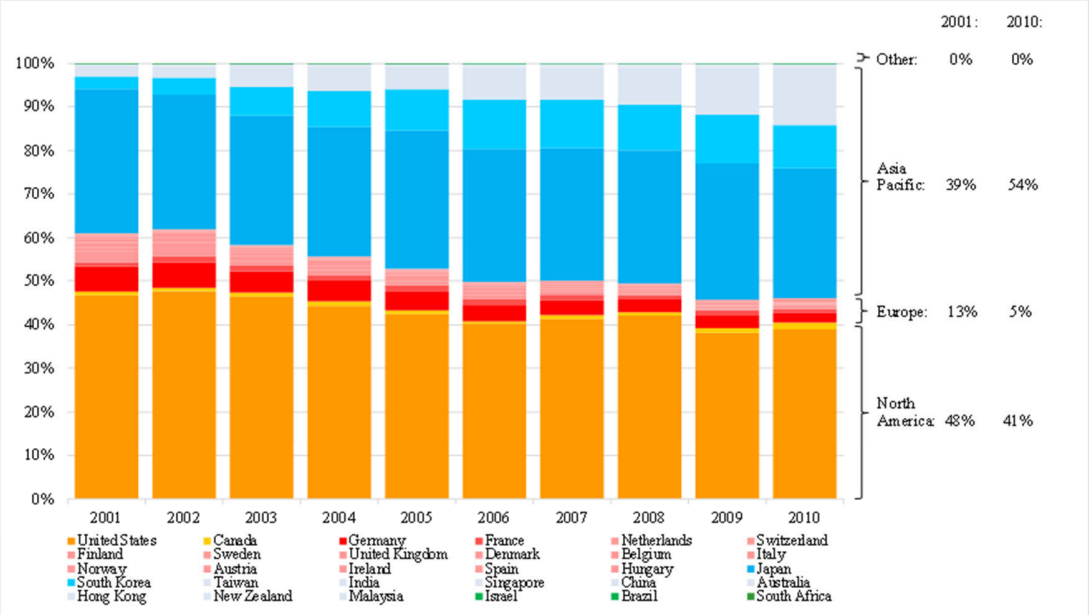


Figure 3
Top 10 Firms: Long-Term Investment

This figure lists the top ten firms in terms of CAPEX in US$ billions (Panel A), R&D expenditures in US$ billions (Panel B) and number of patents filed with the USPTO (Panel B) by year. The sample consists of Worldscope non-financial and non-utility firms in the 2001-2010 period. Cells are colored by geographical region (North America in orange, Europe in red, Asia-Pacific in blue, and Other in green).

Panel A: Capital Expenditures (US$ billions)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1	FR Tlm (FR$8)	Daimler (DE,$26)	Daimler (DE,$28)	Daimler (DE,$33)	Daimler (DE,$32)	Daimler (DE,$41)	Daimler (DE,$23)	BMW (DE,$27)	PetroChina (CN,$38)	Petrobras (BR,$47)
2	Daimler (DE,$24)	Nippon (JP,$21)	Nippon (JP,$16)	Nippon (JP,$17)	Nippon (JP,$14)	Toyota (JP,$23)	Dutch Shell (UK,$24)	Toyota (JP,$30)	Toyota (JP,$25)	PetroChina (CN,$39)
3	Nippon (JP,$22)	Verizon (US,$12)	Avis (US,$15)	Avis (US,$13)	BMW (DE,$16)	BMW (DE,$20)	Ferrovial (ES,$4)	Dutch Shell (UK,$27)	Dutch Shell (UK,$27)	Dutch Shell (UK,$27)
4	Verizon (US,$17)	Avis (US,$18)	Toyota (JP,$14)	Toyota (JP,$15)	Toyota (JP,$16)	Verizon (US,$17)	Toyota (JP,$25)	PetroChina (CN,$32)	BMW (DE,$18)	Toyota (JP,$16)
5	VW (DE,$6)	BP (UK,$13)	BP (UK,$13)	BP (UK,$14)	BP (UK,$12)	Dutch Shell (UK,$24)	BMW (DE,$26)	Petrobras (BR,$22)	Petrobras (BR,$40)	Exxon (US,$27)
6	AT&T (US,$9)	AT&T (US,$7)	Dutch Shell (UK,$13)	Dutch Shell (UK,$13)	Dutch Shell (UK,$15)	PetroChina (CN,$17)	Verizon (US,$18)	Daimler (DE,$12)	AT&T (US,$17)	BP (UK,$19)
7	Vodafone (UK,$2)	Exxon (US,$11)	Verizon (US,$12)	Exxon (US,$12)	Verizon (US,$15)	WalMart (US,$16)	PetroChina (CN,$24)	AT&T (US,$20)	Chevron (US,$20)	Chevron (US,$20)
8	AT&T (US,$11)	Dutch Shell (UK,$13)	Exxon (US,$13)	BMW (DE,$16)	Avis (US,$12)	Exxon (US,$15)	BP (UK,$18)	BP (UK,$18)	Exxon (US,$22)	BMW (DE,$19)
9	MCI (US,$8)	AT&T (US,$4)	BMW (DE,$12)	Verizon (US,$13)	WalMart (US,$15)	Nippon (JP,$14)	WalMart (US,$15)	Verizon (US,$17)	Conoco (US,$11)	ENI (IT,$17)
10	Toyota (JP,$9)	Toyota (JP,$13)	WalMart (US,$10)	WalMart (US,$13)	Exxon (US,$14)	Avis (US,$11)	Conoco (US,$12)	Chevron (US,$20)	BP (UK,$21)	Verizon (US,$16)

Panel B: R&D Expenditures (US$ billions)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1	Ford (US,$7)	Ford (US,$8)	Ford (US,$8)	Sanofi (FR,$10)	Ford (US,$8)	Pfizer (US,$7)	Toyota (JP,$8)	Toyota (JP,$9)	Toyota (JP,$10)	Roche (CH,$10)
2	Siemens (DE,$6)	Daimler (DE,$6)	Pfizer (US,$7)	Microsoft (US,$8)	Pfizer (US,$7)	Ford (US,$7)	J&J (US,$8)	Microsoft (US,$8)	Roche (CH,$9)	Pfizer (US,$9)
3	IBM (US,$5)	Siemens (DE,$6)	Daimler (DE,$7)	Daimler (DE,$8)	Daimler (DE,$7)	J&J (US,$7)	Pfizer (US,$8)	Roche (CH,$8)	Microsoft (US,$9)	Novartis (CH,$9)
4	Daimler (DE,$5)	Pfizer (US,$5)	Siemens (DE,$6)	Pfizer (US,$8)	Toyota (JP,$6)	Daimler (DE,$7)	Ford (US,$8)	J&J (US,$8)	Pfizer (US,$8)	Toyota (JP,$9)
5	Pfizer (US,$5)	Toyota (JP,$5)	Toyota (JP,$6)	Ford (US,$7)	J&J (US,$6)	Toyota (JP,$7)	Roche (CH,$7)	Pfizer (US,$8)	Novartis (CH,$8)	Microsoft (US,$9)
6	Cisco (US,$5)	Panasonic (JP,$5)	Panasonic (JP,$5)	Siemens (DE,$7)	Microsoft (US,$6)	GlaxoSK (UK,$7)	Microsoft (US,$7)	Novartis (CH,$7)	Nokia (FI,$7)	Merck (US,$8)
7	Ericsson (SE,$4)	GlaxoSK (UK,$4)	GlaxoSK (UK,$5)	Toyota (JP,$7)	Siemens (DE,$6)	Siemens (DE,$7)	Nokia (FI,$7)	Ford (US,$7)	J&J (US,$7)	Samsung (KR,$8)
8	Microsoft (US,$4)	Microsoft (US,$4)	J&J (US,$5)	Panasonic (JP,$6)	IBM (US,$6)	Microsoft (US,$7)	Novartis (CH,$7)	Nokia (FI,$7)	Sanofi (FR,$7)	J&J (US,$7)
9	Motorola (US$4)	IBM (US,$4)	Microsoft (US,$5)	GlaxoSK (UK,$5)	GlaxoSK (UK,$5)	IBM (US,$6)	Sanofi (FR,$7)	Honda (JP,$6)	Boeing (US,$7)	Nokia (FI,$7)
10	Lucent (US,$4)	Intel (US,$4)	IBM (US,$5)	J&J (US,$5)	Panasonic (JP,$5)	Intel (US,$6)	GlaxoSK (UK,$6)	Sanofi (FR,$6)	Honda (JP,$6)	Intel (US,$7)

Figure 3 (continued)

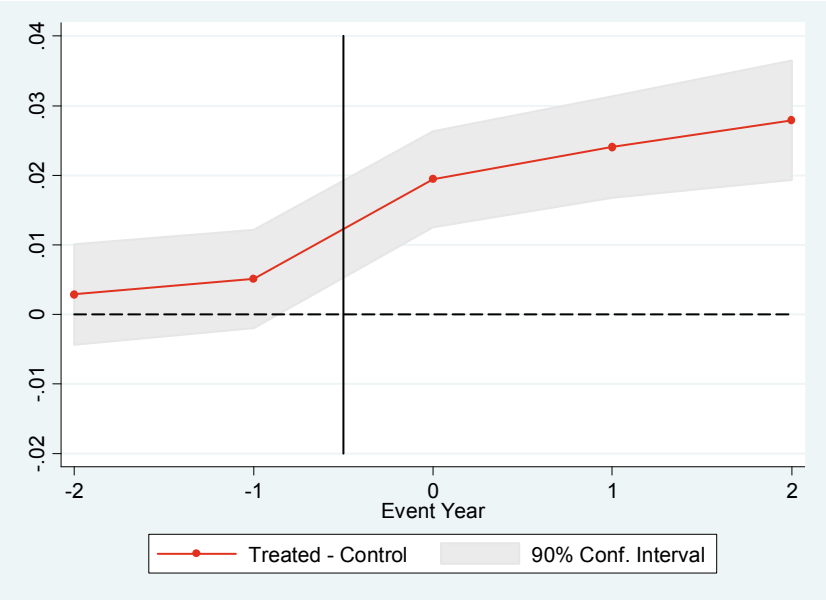
Panel C: Number of Patents

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1	IBM (US,4016)	IBM (US,3547)	IBM (US,3971)	IBM (US,3730)	Samsung (KR,3557)	Samsung (KR,4527)	IBM (US,5252)	IBM (US,6937)	IBM (US,2223)	Hon Hai (TW,1125)
2	HP (US,2675)	HP (US,2321)	Samsung (KR,3015)	Samsung (KR,3637)	IBM (US,3731)	IBM (US,3691)	Samsung (KR,4391)	Samsung (KR,3284)	Samsung (KR,2107)	Samsung (KR,1020)
3	Panasonic (JP,2424)	Panasonic (JP,2168)	HP (US,2685)	Microsoft (US,2918)	Microsoft (US,3382)	Panasonic (JP,2214)	Panasonic (JP,1871)	Panasonic (JP,1468)	Hon Hai (TW,1514)	IBM (US,807)
4	Hitachi (JP,2219)	Samsung (KR,2040)	Panasonic (JP,2355)	Panasonic (JP,2480)	Panasonic (JP,2412)	Microsoft (US,2050)	Microsoft (US,1664)	Sony (JP,1411)	Sony (JP,1106)	Panasonic (JP,552)
5	Sony (JP,1941)	Intel (US,2040)	Intel (US,2263)	Intel (US,1949)	Sony (JP,2168)	Sony (JP,1678)	Sony (JP,1640)	Hon Hai (TW,1354)	Panasonic (JP,956)	Sony (JP,526)
6	Micron (US,1940)	Micron (US,2021)	Microsoft (US,1762)	HP (US,1839)	Fujitsu (JP,1657)	Intel (US,1422)	Hitachi (JP,1214)	Hitachi (JP,1312)	Fujitsu (JP,856)	NEC (JP,488)
7	Intel (US,1805)	Hitachi (JP,1884)	Micron (US,1578)	Hitachi (JP,1713)	Intel (US,1642)	Micron (US,1402)	Seiko (JP,1207)	Microsoft (US,1174)	Seiko (JP,852)	Micron (US,469)
8	Philips (NL,1726)	Sony (JP,1602)	Sony (JP,1539)	Micron (US,1635)	HP (US,1552)	Seiko (JP,1369)	LG (KR,1128)	Seiko (JP,1121)	Hitachi (JP,668)	Seiko (JP,442)
9	Fujitsu (JP,1617)	Philips (NL,1465)	Hitachi (JP,1539)	Sony (JP,1610)	Seiko (JP,1372)	Hitachi (JP,1320)	Intel (US,1082)	Ricoh (JP,1059)	LG (KR,640)	Hitachi (JP,372)
10	Samsung (KR,1607)	Fujitsu (JP,1404)	Fujitsu (JP,1230)	Fujitsu (JP,1445)	Micron (US,1352)	Fujitsu (JP,1244)	Ricoh (JP,1076)	Fujitsu (JP,911)	Ricoh (JP,626)	Fujitsu (JP,370)

Figure 4
Parallel Trends of Difference-in-Differences around Stock Additions to the MSCI

This figure shows point estimates and 90% confidence intervals of difference-in-differences regressions of institutional ownership, long-term investment and patent count around stock additions to the MSCI All Country World Index. The index additions occur between year -1 and year 0. Treated firms are firms that were added to the MSCI. Control firms are the nearest neighbor firms matched using propensity scores. The sample includes Worldscope non-financial and non-utility firms in the 2001-2010 period. Variable definitions are provided in Appendix A.

Panel A: Foreign Institutional Ownership



Panel B: Domestic Institutional Ownership

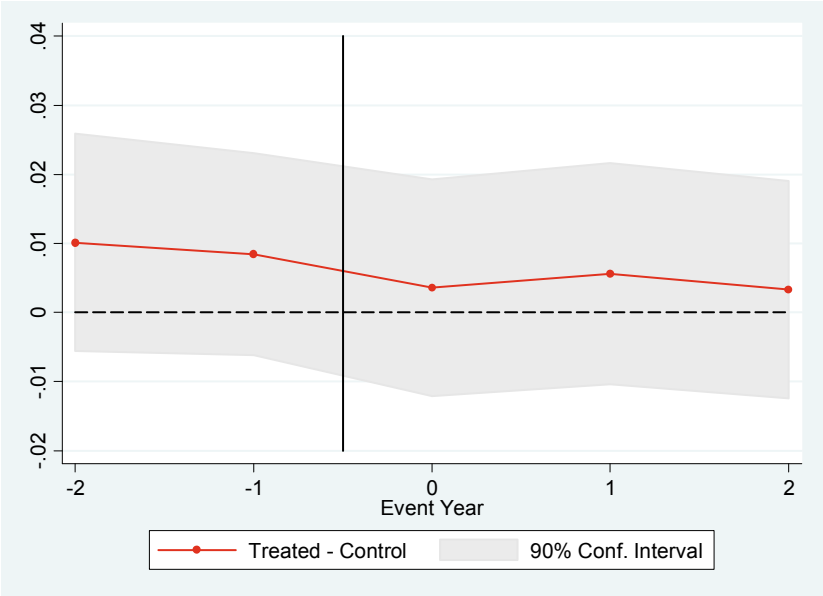
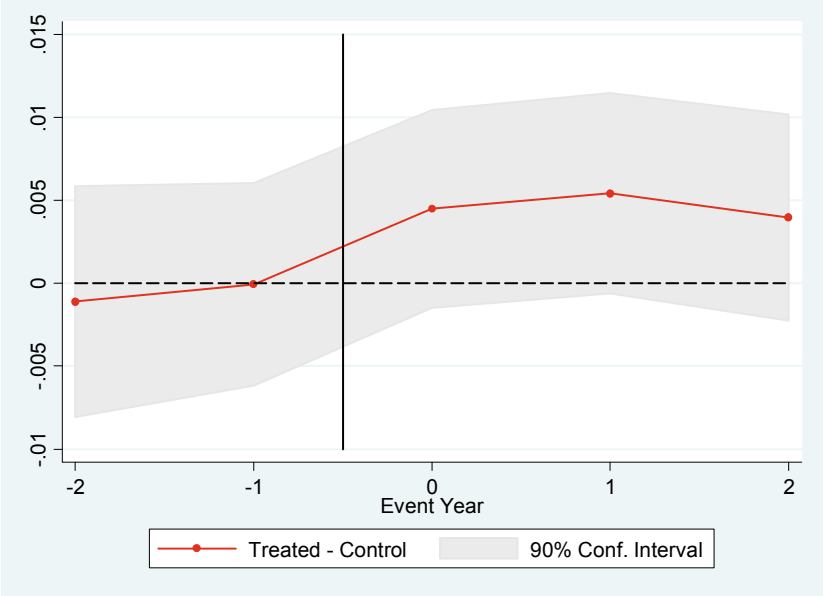


Figure 4 (continued)

Panel C: Long-Term Investment



Panel D: Patent Count

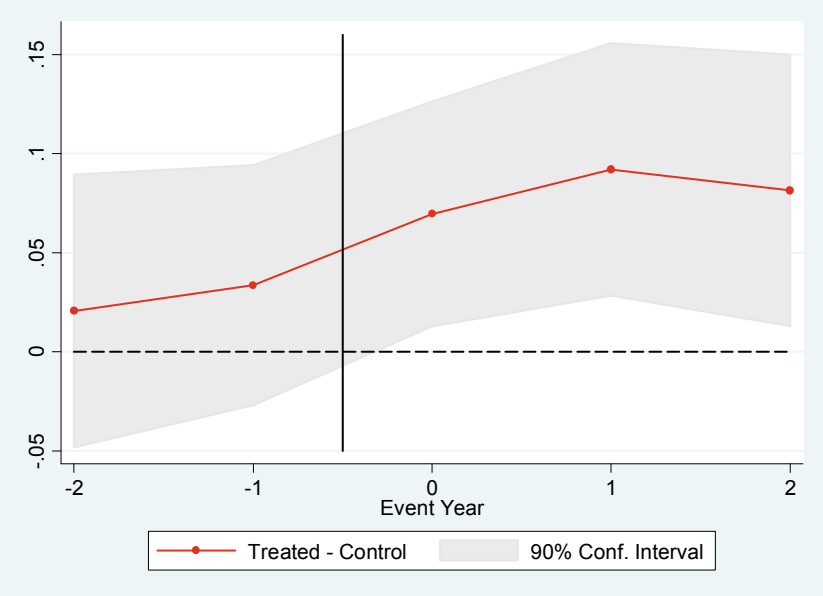
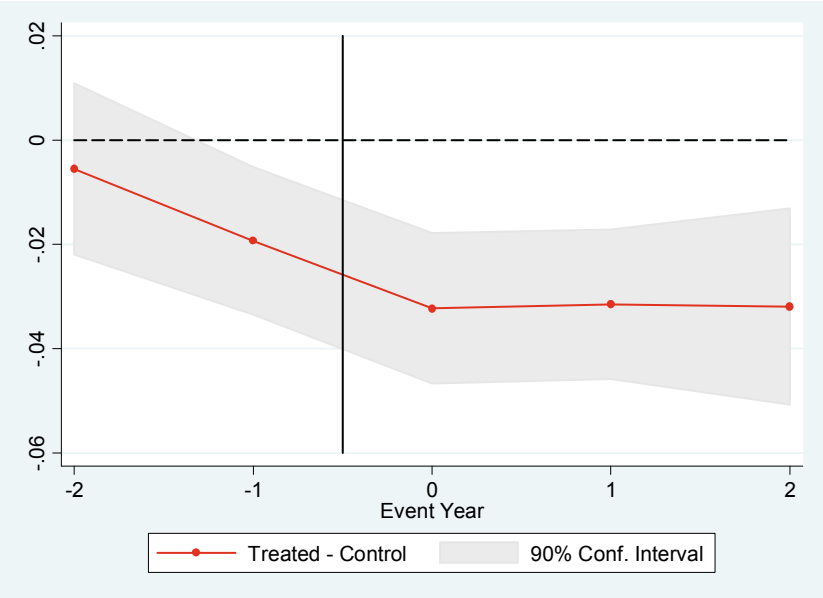


Figure 5
Parallel Trends of Difference-in-Differences around Stock Deletions from the MSCI

This figure shows point estimates and 90% confidence intervals of difference-in-differences regressions of institutional ownership, long-term investment and innovation output around stock deletions from the MSCI All Country World Index. The index deletions occur between year -1 and year 0. Treated firms are firms that were removed from the MSCI. Control firms are the nearest neighbor firms matched using propensity scores. The sample includes Worldscope non-financial and non-utility firms in the 2001-2010 period. Variable definitions are provided in Appendix A.

Panel A: Foreign Institutional Ownership



Panel B: Domestic Institutional Ownership

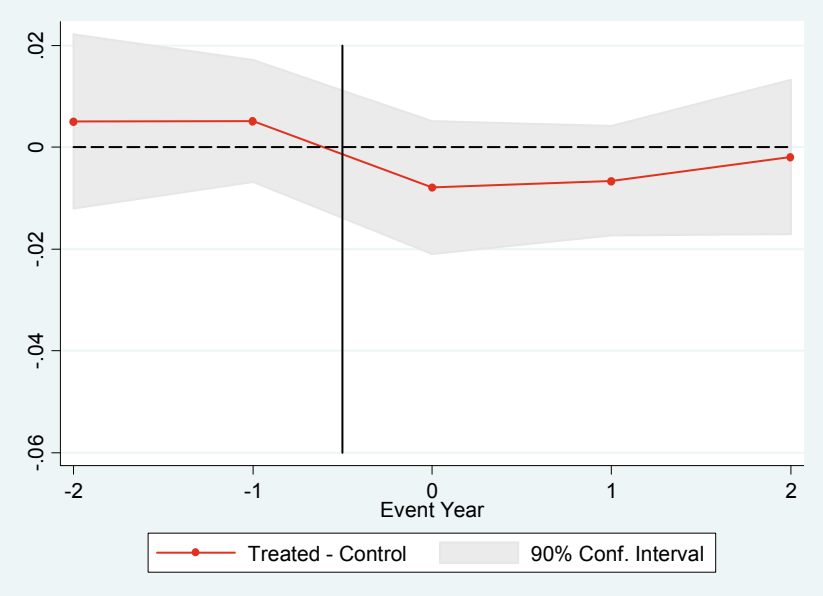
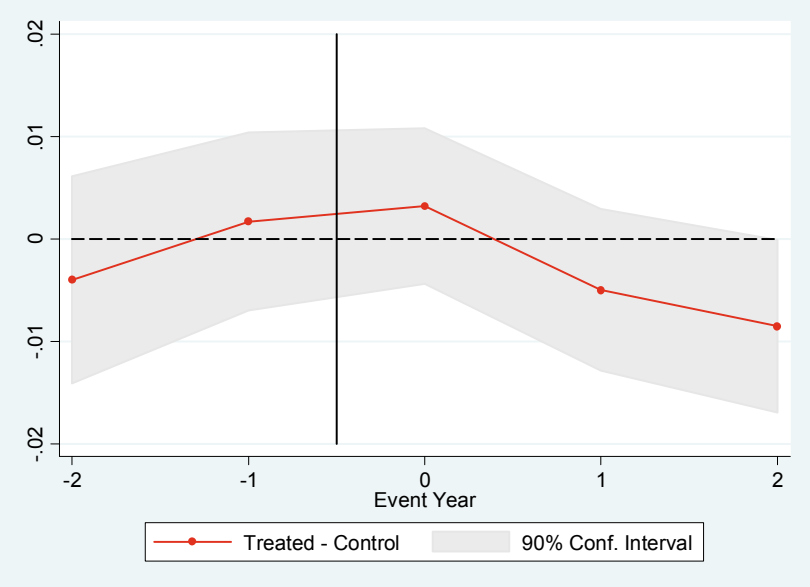


Figure 5 (continued)

Panel C: Long-Term Investment



Panel D: Patent Count

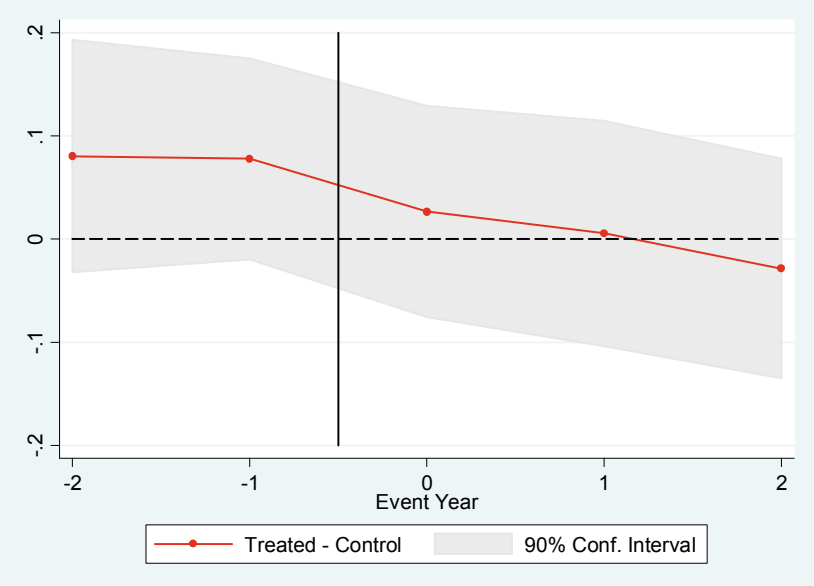


Table 1
Sample of Firms and Innovation Activity

This table shows the number of publicly-listed firms in the sample by country (Panel A) and industry (Panel B). The sample consists of Worldscope non-financial and non-utility firms in the 2001-2010 period. Variable definitions are provided in Appendix A.

Panel A: Sample Statistics by Country

		Sample of Firms			Capital Expenditures		R&D Expenditures		Number of Patents	
Region	Country	Firms	Foreign IO (2009)	Domestic IO (2009)	Total ($ bln, 2001-2010)	Average CAPEX/ Assets	R&D ($ bln, 2001-2010)	Average R&D/ Assets	Total (2001-2010)	Average Patent Count
North America	United States	8,657	0.08	0.67	4,702.1	0.050	1,873.5	0.051	298,200	6.17
	Canada	1,311	0.26	0.27	610.2	0.085	40.5	0.034	5,957	1.15
Europe	Germany	919	0.23	0.06	1,045.8	0.050	410.5	0.022	29,484	4.90
	France	977	0.19	0.08	900.6	0.046	235.2	0.015	8,767	1.41
	Netherlands	192	0.34	0.03	224.6	0.051	100.7	0.014	7,893	5.97
	Switzerland	224	0.25	0.04	193.3	0.044	194.8	0.028	5,759	3.55
	Finland	145	0.26	0.09	77.0	0.055	63.5	0.034	5,347	4.66
	Sweden	499	0.14	0.26	131.9	0.037	76.7	0.024	4,407	1.50
	United Kingdom	2,199	0.20	0.13	1,107.8	0.047	201.3	0.026	2,476	0.20
	Denmark	160	0.21	0.07	98.6	0.058	22.4	0.026	1,343	1.24
	Belgium	135	0.18	0.01	84.3	0.058	19.4	0.019	875	0.99
	Italy	269	0.18	0.02	341.7	0.042	53.1	0.006	751	0.41
	Norway	259	0.13	0.10	179.3	0.074	7.9	0.013	304	0.22
	Austria	107	0.20	0.02	62.2	0.067	4.9	0.021	231	0.36
	Ireland	84	0.39	0.01	34.6	0.049	5.1	0.017	12	0.03
	Spain	148	0.18	0.02	309.3	0.049	3.4	0.003	42	0.04
	Hungary	40	0.23	0.01	18.6	0.082	1.0	0.007	53	0.23
Asia Pacific	Japan	4,152	0.09	0.04	2,673.3	0.036	1,143.5	0.013	212,034	6.56
	South Korea	1,691	0.14	0.00	676.1	0.053	77.9	0.009	56,020	5.81
	Taiwan	1,573	0.15	0.02	337.1	0.050	74.7	0.025	41,147	4.29
	India	1,121	0.08	0.03	250.9	0.081	9.5	0.003	1,869	0.45
	Singapore	534	0.13	0.02	67.4	0.048	2.9	0.002	1,289	0.58
	China	1,904	0.09	0.06	950.6	0.062	32.2	0.002	752	0.07
	Australia	1,049	0.17	0.02	284.5	0.067	7.4	0.016	372	0.08
	Hong Kong	857	0.11	0.03	365.0	0.043	8.7	0.005	32	0.01
	New Zealand	49	0.12	0.03	10.7	0.070	0.2	0.006	77	0.39
	Malaysia	898	0.06	0.01	53.2	0.044	1.3	0.001	14	0.00
Other	Israel	298	0.47	0.01	25.1	0.035	12.3	0.050	825	0.62
	Brazil	205	0.24	0.03	343.9	0.065	9.0	0.001	192	0.21
	South Africa	296	0.20	0.04	117.8	0.067	2.1	0.003	17	0.01
	Non-U.S.	22,295	0.16	0.07	11,575.4	0.050	2,822.0	0.015	388,341	2.92
	All Countries	30,952	0.13	0.30	16,277.5	0.050	4,695.5	0.024	686,541	3.79

Table 1 (continued)

Panel B: Sample Statistics by Industry

			Capital Expenditures		R&D Expenditures		Number of Patents	
	Industry	Firms	Total (US$ bln, 2001-2010)	Average CAPEX/ Assets	Total (US$ bln, 2001-2010)	Average R&D/ Assets	Total (2001-2010)	Average Patent Count
Non-U.S. Firms	1: Consumer Non-Durables	2,244	529.4	0.046	97.2	0.005	5,065	0.36
	2:Consumer Durables	1,013	1,645.2	0.056	733.9	0.016	112,615	17.15
	3: Manufacturing	3,838	1,485.5	0.049	471.8	0.010	61,245	2.55
	4: Energy	831	1,860.1	0.129	46.0	0.002	762	0.22
	5: Chemicals and Allied Products	952	399.2	0.055	158.8	0.013	21,010	3.37
	6: Business Equipment	4,315	775.7	0.043	606.4	0.036	165,387	6.60
	7: Telecom	509	1,506.6	0.066	87.9	0.007	3,781	1.35
	9: Shops	2,622	1,031.8	0.042	40.6	0.002	2,614	0.16
	10: Healthcare	1,105	269.1	0.047	511.4	0.047	13,980	2.20
	12: Other	4,866	2,072.9	0.050	67.8	0.007	1,882	0.07
U.S. Firms	1: Consumer Non-Durables	474	204.5	0.040	28.5	0.009	2,664	0.99
	2:Consumer Durables	209	134.1	0.044	126.7	0.034	11,272	8.98
	3: Manufacturing	832	323.9	0.042	186.7	0.025	32,846	6.34
	4: Energy	472	1,153.1	0.155	25.2	0.004	580	0.23
	5: Chemicals and Allied Products	215	141.3	0.041	85.8	0.035	4,795	3.73
	6: Business Equipment	2,306	451.8	0.035	840.3	0.099	214,557	16.85
	7: Telecom	395	650.0	0.067	9.2	0.019	2,521	1.32
	9: Shops	954	592.9	0.057	16.6	0.005	1,073	0.20
	10: Healthcare	1,128	267.0	0.036	524.0	0.109	24,330	3.64
	12: Other	1,672	783.5	0.052	30.6	0.019	3,562	0.41
All Firms	1: Consumer Non-Durables	2,718	733.9	0.046	125.6	0.006	7,729	0.47
	2:Consumer Durables	1,222	1,779.3	0.054	860.7	0.019	123,887	15.84
	3: Manufacturing	4,670	1,809.5	0.048	658.5	0.012	94,091	3.23
	4: Energy	1,303	3,013.1	0.140	71.1	0.002	1,342	0.22
	5: Chemicals and Allied Products	1,167	540.5	0.053	244.6	0.016	25,805	3.43
	6: Business Equipment	6,621	1,227.4	0.040	1,446.7	0.058	379,944	10.05
	7: Telecom	904	2,156.6	0.067	97.2	0.012	6,302	1.34
	9: Shops	3,576	1,624.7	0.046	57.2	0.003	3,687	0.17
	10: Healthcare	2,233	536.1	0.041	1,035.4	0.079	38,310	2.94
	12: Other	6,538	2,856.4	0.050	98.4	0.010	5,444	0.15

Table 2
Summary Statistics

This table shows mean, median, standard deviation, minimum, maximum and number of observations for each variable. Variable definitions are provided in Appendix A. The sample consists of Worldscope non-financial and non-utility firms in the 2001-2010 period. All variables are winsorized at the top and bottom 1%.

	Mean	Median	Standard Deviation	Minimum	Maximum	Number of Observations
CAPEX+R&D	0.071	0.043	0.085	0	0.798	181,173
PATENTS	1.28	0	5.809	0	43	181,173
EMPLOYEES	4,133	650	10,888	1	70,700	166,305
STAFF_COSTS	0.342	0.185	0.858	0.001	9.238	73,259
AVG_STAFF_COSTS ($ thousands)	45	36	43	0	328	70,274
SG&A	0.757	0.201	3.304	0.009	34.308	144,800
SALES ($ million)	941	120	2,740	0.001	18,341	181,173
TOBIN_Q	2.12	1.243	4.451	0.413	60.589	171,432
CEO_TURNOVER	0.139	0	0.346	0	1	29,885
IO_TOTAL	0.153	0.021	0.259	0	1	181,173
IO_FOR	0.027	0.001	0.067	0	1	181,173
IO_DOM	0.126	0.004	0.246	0	1	181,173
IO_FOR_US	0.011	0	0.045	0	1	181,173
IO_FOR_NUS	0.016	0	0.038	0	1	181,173
IO_COMMON	0.134	0.005	0.255	0	1	181,173
IO_CIVIL	0.018	0	0.047	0	1	181,173
IO_INDEPENDENT	0.127	0.015	0.223	0	1	181,173
IO_GREY	0.025	0	0.049	0	1	181,173
IO_FOR_ST	0.009	0	0.029	0	1	181,173
IO_FOR_LT	0.018	0	0.048	0	1	181,173
INV_TURNOVER	0.689	0.651	0.267	0.023	3.217	112,488
CLOSE	0.287	0.242	0.275	0	0.913	181,173
FXSALES	0.157	0	0.272	0	0.954	181,173
K/L	192	41	790	0.001	9,959	181,173
R&D_STOCK ($ million)	30	0	92	0	490	181,173
GOV	0.537	0.537	0.128	0.22	0.927	37,061
COMPETITION	0.753	0.771	0.105	0.565	1.48	181,172
FCF	-0.132	0.015	0.729	-7.818	0.344	179,360
KZ_INDEX	0.891	0.645	2.578	-5.031	22.602	170,107
AMIHUD	0.048	0	0.694	0	25.092	172,743
LEVERAGE	0.257	0.194	0.346	0	3.219	181,046
CASH	0.18	0.116	0.189	0	0.989	180,998
PPE	0.284	0.24	0.222	0	0.948	181,166
DIVIDENDS	0.011	0.001	0.023	0	0.162	171,281
RETURN	0.104	-0.042	0.809	-1.18	5.542	170,705
ROA	-0.099	0.036	0.681	-7.424	0.375	176,601
MSCI	0.077	0	0.266	0	1	181,173

Table 3
Foreign Institutional Ownership and Long-Term Investment

This table shows estimates of firm-level panel regressions of long-term investment on institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001-2010 period. The dependent variable is the sum of annual capital expenditures (*CAPEX*) and R&D expenditures (*R&D*) as a percentage of assets. Variable definitions are provided in Appendix A. All explanatory variables are lagged by one year. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Pooled OLS			Fixed Effects		
	(1)	(2)	(3)	(4)	(5)	(6)
IO_TOTAL	0.001			0.004		
	(0.002)			(0.004)		
IO_FOR		0.041***	0.041***		0.022***	0.022***
		(0.006)	(0.006)		(0.005)	(0.005)
IO_DOM			-0.003			0.001
			(0.002)			(0.005)
CLOSE	-0.002	-0.001	-0.002	0.004***	0.004***	0.005***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
FXSALES	0.019***	0.017***	0.017***	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
log(*SALES*)	-0.002***	-0.002***	-0.002***	-0.001	-0.001	-0.001
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
log(*K*/*L*)	0.004***	0.004***	0.004***	0.001**	0.001**	0.001**
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
TOBIN_Q	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
FCF	-0.009***	-0.009***	-0.009***	-0.002***	-0.002***	-0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
LEVERAGE	-0.017***	-0.017***	-0.017***	-0.023***	-0.023***	-0.023***
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
CASH	0.102***	0.101***	0.101***	0.038***	0.038***	0.038***
	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)
PPE	0.083***	0.083***	0.083***	-0.036***	-0.036***	-0.036***
	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	No	No	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	No	No	No
Country fixed effects	Yes	Yes	Yes	No	No	No
R^2	0.20	0.21	0.21	0.65	0.65	0.65
Number of observations	179,125	179,125	179,125	179,125	179,125	179,125

Table 4
Foreign Institutional Ownership and Innovation Output

This table shows estimates of firm-level panel regressions of innovation output on institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001-2010 period. The dependent variable is the logarithm of one plus the annual number of patents applied with the USPTO. Variable definitions are provided in Appendix A. All explanatory variables are lagged by one year. For fixed-effects regressions of patents a firm is required to have made at least one patent application over the sample period. In addition, a firm must have at least two observations. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels.

	Pooled OLS			Fixed Effects		
	(1)	(2)	(3)	(4)	(5)	(6)
IO_TOTAL	0.359***			0.124***		
	(0.037)			(0.028)		
IO_FOR		0.565***	0.611***		0.239**	0.243**
		(0.084)	(0.084)		(0.099)	(0.099)
IO_DOM			0.329***			0.107***
			(0.045)			(0.033)
CLOSE	-0.029	-0.079***	-0.031*	0.054***	0.046**	0.054***
	(0.018)	(0.026)	(0.018)	(0.020)	(0.018)	(0.020)
FXSALES	0.217***	0.216***	0.209***	-0.056**	-0.056**	-0.057**
	(0.032)	(0.031)	(0.030)	(0.028)	(0.028)	(0.028)
log(*SALES*)	0.037***	0.051***	0.037***	0.051***	0.053***	0.051***
	(0.004)	(0.003)	(0.004)	(0.007)	(0.006)	(0.006)
log(*K*/*L*)	0.018***	0.019***	0.018***	-0.001	-0.001	-0.001
	(0.004)	(0.004)	(0.004)	(0.008)	(0.008)	(0.008)
log(*R&D_STOCK*)	0.048***	0.048***	0.048***	0.009***	0.009***	0.009***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	No	No	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	No	No	No
Country fixed effects	Yes	Yes	Yes	No	No	No
R^2	0.27	0.27	0.27	0.82	0.82	0.82
Number of observations	181,173	181,173	181,173	48,096	48,096	48,096

Table 5
Long-Term Effects of Foreign Institutional Ownership: Instrumental Variables

This table shows estimates of two-stage least squares (2SLS) panel regressions of long-term investment (Panel A) and innovation output (Panel B) using a sample of Worldscope non-financial and non-utility firms in the 2001-2010 period. Foreign institutional ownership is instrumented with MSCI (a dummy variable that equals one if a firm is a member of the MSCI All Country World Index, and zero otherwise). Regressions include the same control variables as in Table 3 and Table 4 (coefficients not shown). Variable definitions are provided in Appendix A. All explanatory variables are lagged by one year. For fixed-effects regressions of patents a firm is required to have made at least one patent application at USPTO. In addition, a firm must have at least two observations. Robust standard errors adjusted for country-year level (columns (1)-(2)) or firm-level (columns (3)-(4)) clustering are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Long-Term Investment

	Pooled OLS		Fixed Effects	
	First-stage regression	Second-stage regression	First-stage regression	Second-stage regression
Dependent variable	*IO_FOR*	*CAPEX+R&D*	*IO_FOR*	*CAPEX+R&D*
	(1)	(2)	(3)	(4)
IO_FOR		0.108***		0.094**
		(0.016)		(0.038)
IO_DOM	-0.014***	-0.002	0.003*	0.001
	(0.002)	(0.002)	(0.002)	(0.003)
MSCI	0.063***		0.029***	
	(0.003)		(0.002)	
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	No	No	Yes	Yes
Industry fixed effects	Yes	Yes	No	No
Country fixed effects	Yes	Yes	No	No
R^2	0.30		0.81	
Number of observations	179,125	179,125	179,125	179,125

Panel B: Patent Counts

	Pooled OLS		Fixed Effects	
	First-stage regression	Second-stage regression	First-stage regression	Second-stage regression
Dependent variable	*IO_FOR*	*log(1+PATENTS)*	*IO_FOR*	*log(1+PATENTS)*
	(1)	(2)	(3)	(4)
IO_FOR		7.662***		3.655***
		(0.815)		(1.006)
IO_DOM	-0.010***	0.463***	-0.005*	0.127***
	(0.002)	(0.047)	(0.003)	(0.043)
MSCI	0.065***		0.027***	
	(0.003)		(0.002)	
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	No	No	Yes	Yes
Industry fixed effects	Yes	Yes	No	No
Country fixed effects	Yes	Yes	No	No
R^2	0.29		0.82	
Number of observations	181,173	181,173	48,096	48,096

Table 6
Summary Statistics of MSCI Additions/Deletions Matched Samples

This table shows tests of equality of pre-treatment means and medians of non-treated, treated and control groups. Treated firms are firms that were added to (Panel A) or deleted from (Panel B) the MSCI All Country World Index. Control firms are the nearest neighbor firms matched using propensity scores. Non-treated firms are all other firms in the sample. Panel A reports the statistics for the 574 firms that were added to the MSCI (treated) and the respective matched firms (control). Panel B reports the statistics for the 167 firms that were deleted from the MSCI (treated) and the respective matched firms (control). The sample includes Worldscope non-financial and non-utility firms in the 2001-2010 period. Variable definitions are provided in Appendix A.

Panel A: MSCI Additions

	Mean				Median			
	Non-Treated	Treated	Control	*t*-test (p-value)	Non-Treated	Treated	Control	Pearson χ^2 (p-value)
CAPEX+R&D	0.093	0.080	0.075	0.07	0.048	0.063	0.062	0.62
log(1+*PATENTS*)	0.220	0.823	0.854	0.58	0.000	0.000	0.000	0.76
CLOSE	0.287	0.302	0.316	0.19	0.241	0.266	0.278	0.38
FXSALES	0.150	0.265	0.265	0.99	0.000	0.149	0.167	0.48
log(*SALES*)	11.438	14.418	14.472	0.40	11.570	14.413	14.564	0.03
log(*R&D_STOCK*)	4.030	6.109	6.089	0.93	0.000	8.486	7.789	0.34
log(*K/L*)	3.690	4.444	4.396	0.46	3.673	4.294	4.240	0.59
IO_FOR	0.023	0.072	0.072	0.89	0.001	0.039	0.033	0.01

Panel B: MSCI Deletions

	Mean				Median			
	Non-Treated	Treated	Control	*t*-test (p-value)	Non-Treated	Treated	Control	Pearson χ^2 (p-value)
CAPEX+R&D	0.092	0.070	0.065	0.28	0.049	0.055	0.048	0.10
log(1+*PATENTS*)	0.248	0.541	0.521	0.81	0.000	0.000	0.000	0.79
CLOSE	0.287	0.280	0.311	0.07	0.241	0.248	0.294	0.03
FXSALES	0.154	0.316	0.326	0.70	0.000	0.189	0.203	0.94
log(*SALES*)	11.569	13.860	14.195	0.01	11.664	13.926	14.232	0.10
log(*R&D_STOCK*)	4.104	6.946	7.543	0.13	0.000	8.885	9.072	0.70
log(*K/L*)	3.724	4.060	4.114	0.60	3.705	4.014	4.243	0.14
IO_FOR	0.026	0.095	0.106	0.38	0.001	0.057	0.054	0.70

Table 7
Difference-in-Differences around Stock Additions and Deletions to the MSCI

This table shows estimates of difference-in-differences regressions of institutional ownership, long-term investment, and innovation output around stock additions and deletions from the MSCI All Country World Index (MSCI). The sample includes Worldscope non-financial and non-utility firms in the 2001-2010 period. The dependent variable is, alternatively, foreign institutional ownership (*IO_FOR*), domestic institutional ownership (*IO_DOM*), the ratio of the sum of capital expenditures and R&D expenditures to assets (*CAPEX+R&D*), and the logarithm of one plus the annual number of patents applied with the USPTO (*log(1+PATENTS)*). The sample includes 574 firms that were added to the MSCI and 167 firms that were deleted from the MSCI. Variable definitions are provided in Appendix A. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels.

Panel A: MSCI Additions

Dependent variable	*IO_FOR*	*IO_DOM*	*CAPEX+R&D*	log(1+*PATENTS*)
	(1)	(2)	(3)	(4)
TREATED × AFTER	0.020***	-0.005	0.005***	0.054**
	(0.003)	(0.004)	(0.002)	(0.022)
Firm fixed effects	Yes	Yes	Yes	Yes
R^2	0.86	0.97	0.78	0.95
Number of observations	5,740	5,740	5,740	5,740

Panel B: MSCI Deletions

Dependent variable	*IO_FOR*	*IO_DOM*	*CAPEX+R&D*	log(1+*PATENTS*)
	(1)	(2)	(3)	(4)
TREATED × AFTER	-0.019***	-0.011**	-0.002	-0.078**
	(0.005)	(0.005)	(0.004)	(0.037)
Firm fixed effects	Yes	Yes	Yes	Yes
R^2	0.92	0.96	0.76	0.91
Number of observations	1,670	1,670	1,670	1,670

Table 8
Long-Term Effects of Foreign Institutional Ownership: Alternative Channels

This table shows estimates of firm-level panel regressions of long-term investment (Panel A) and innovation output (Panel B) on the interaction between foreign institutional ownership and alternative channels using a sample of Worldscope non-financial and non-utility firms in the 2001-2010 period. The dependent variable is either the sum of annual capital expenditures (*CAPEX*) and R&D expenditures (*R&D*) as a percentage of assets (Panel A) or the logarithm of one plus the annual number of patents applied with the USPTO (Panel B). Corporate governance is measured using the *GOV* index. Investor horizon is measured by the weighted average churn rate of institutional investors (*INV_TURNOVER*). Product market competition is measured using one minus the median industry Lerner index (*COMPETITION*). Financial constraints are measured by the Kaplan-Zingales (*KZ_INDEX*). Stock liquidity is measured by the Amihud illiquidity ratio (*AMIHUD*). Regressions include the same control variables as in Table 3 and Table 4 (coefficients not shown). Variable definitions are provided in Appendix A. All explanatory variables are lagged by one period. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Long-Term Investment

	(1)	(2)	(3)	(4)	(5)
IO_FOR	0.170***	0.075***	0.034**	0.042***	0.039***
	(0.022)	(0.021)	(0.017)	(0.006)	(0.006)
IO_DOM	0.006***	-0.005**	-0.004*	-0.004*	-0.006***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
GOV	0.019***				
	(0.006)				
GOV × IO_FOR	-0.249***				
	(0.036)				
INV_TURNOVER		0.010***			
		(0.001)			
INV_TURNOVER × IO_FOR		-0.059**			
		(0.027)			
COMPETITION			-0.014**		
			(0.006)		
COMPETITION × IO_FOR			0.009		
			(0.023)		
KZ_INDEX				0.003***	
				(0.000)	
KZ_INDEX × IO_FOR				-0.000	
				(0.002)	
AMIHUD					-0.003***
					(0.001)
AMIHUD × IO_FOR					-0.011***
					(0.001)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes
R^2	0.31	0.26	0.21	0.21	0.21
Number of observations	36,957	111,792	179,124	170,107	170,874

Table 8 (continued)

Panel B: Patent Counts

	(1)	(2)	(3)	(4)	(5)
IO_FOR	2.782***	1.881***	1.468***	0.676***	0.581***
	(0.708)	(0.422)	(0.188)	(0.085)	(0.084)
IO_DOM	0.230***	0.283***	0.330***	0.345***	0.323***
	(0.027)	(0.041)	(0.045)	(0.043)	(0.045)
GOV	0.271***				
	(0.050)				
GOV × *IO_FOR*	-2.880**				
	(1.303)				
INV_TURNOVER		0.034			
		(0.022)			
INV_TURNOVER × *IO_FOR*		-1.933***			
		(0.556)			
COMPETITION			0.117***		
			(0.031)		
COMPETITION × *IO_FOR*			-1.114***		
			(0.209)		
KZ_INDEX				0.009***	
				(0.001)	
KZ_INDEX × *IO_FOR*				-0.096***	
				(0.031)	
AMIHUD					0.011***
					(0.002)
AMIHUD × *IO_FOR*					-0.086***
					(0.006)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes
R^2	0.38	0.29	0.27	0.27	0.28
Number of observations	37,061	112,488	181,172	170,107	172,743

Table 9
Foreign Institutional Ownership and CEO Turnover-Performance Sensitivity

This table shows estimates of firm-level probit regressions of CEO turnover-performance sensitivity and foreign institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001-2010 period. The dependent variable (*CEO_TURNOVER*) is one if the firm's CEO is terminated in year *t*. The marginal effects of the interactions between foreign institutional ownership and excess stock return (*RETURN*) or change in return on assets (Δ*ROA*), estimated using the Ai and Norton (2003) procedure, are included at the bottom. Variable definitions are provided in Appendix A. All explanatory variables are lagged by one year. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)
IO_FOR	-0.048	-0.054
	(0.149)	(0.149)
RETURN × *IO_FOR*	-0.683**	
	(0.284)	
Δ*ROA* × *IO_FOR*		-1.362**
		(0.635)
IO_DOM	-0.065	-0.063
	(0.057)	(0.063)
RETURN	-0.175***	
	(0.040)	
Δ*ROA*		-0.081***
		(0.022)
log(*SALES*)	0.022***	0.023***
	(0.007)	(0.008)
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Country fixed effects	Yes	Yes
Pseudo R^2	0.02	0.01
Number of observations	29,187	26,671
Marginal effect:		
RETURN × *IO_FOR*	-0.144**	
	(0.062)	
Δ*ROA* × *IO_FOR*		-0.295**
		(0.139)

Table 10
Foreign Institutional Ownership and Innovation Output: Common Law versus Civil Law Countries

This table shows estimates of firm-level panel regressions of innovation output on institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001-2010 period. Panel A reports the results for civil-law countries. Panel B reports the results for common-law countries. The dependent variable is the logarithm of one plus the annual number of patents applied with the USPTO. Regressions include the same control variables as in Table 4 (coefficients not shown). Variable definitions are provided in Appendix A. All explanatory variables are lagged by one period. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Civil Law

	(1)	(2)	(3)	(4)	(5)
IO_FOR	0.675***				
	(0.127)				
IO_DOM	-0.338**	-0.286*			-0.347**
	(0.165)	(0.166)			(0.163)
IO_FOR_US		1.197***			
		(0.191)			
IO_FOR_NUS		0.214*			
		(0.110)			
IO_COMMON			0.871***		
			(0.166)		
IO_CIVIL			-0.209		
			(0.137)		
IO_INDEPENDENT				0.560***	
				(0.143)	
IO_GREY				-0.444**	
				(0.176)	
IO_FOR_ST					0.250
					(0.298)
IO_FOR_LT					0.890***
					(0.230)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes
R^2	0.27	0.27	0.27	0.27	0.27
Number of observations	90,119	90,119	90,119	90,119	90,119

Table 10 (continued)

Panel B: Common Law

	(1)	(2)	(3)	(4)	(5)
IO_FOR	0.360***				
	(0.065)				
IO_DOM	0.456***	0.434***			0.456***
	(0.036)	(0.039)			(0.035)
IO_FOR_US		-0.080			
		(0.127)			
IO_FOR_NUS		1.325***			
		(0.252)			
IO_COMMON			0.428***		
			(0.035)		
IO_CIVIL			2.159***		
			(0.541)		
IO_INDEPENDENT				0.295***	
				(0.046)	
IO_GREY				1.475***	
				(0.190)	
IO_FOR_ST					0.355
					(0.248)
IO_FOR_LT					0.363*
					(0.188)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes
R^2	0.29	0.3	0.3	0.3	0.29
Number of observations	91,038	91,038	91,038	91,038	91,038

Table 11
Foreign Institutional Ownership and Employment

This table shows estimates of firm-level panel regressions of alternative measures of long-term investment on institutional ownership using a Worldscope sample of non-financial and non-utility firms in the 2001-2010 period. The dependent variables are the ratio of selling, general & administrative expenses to total sales (*SG&A*), log of the number of employees (*EMPLOYEES*), ratio of staff costs to total sales (*STAFF_COSTS*), and the log of average staff costs per employee (*AVG_STAFF_COSTS*). Regressions include the same control variables as in Table 3 (coefficients not shown). Variable definitions are provided in Appendix A. All explanatory variables are lagged by one year. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Pooled OLS				Fixed Effects			
Dependent Variable	*SG&A*	*EMPLOYEES*	*STAFF_ COSTS*	*AVG_STAFF_ COSTS*	*SG&A*	*EMPLOYEES*	*STAFF_ COSTS*	*AVG_STAFF_ COSTS*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IO_FOR	2.992***	1.131***	0.835***	0.426***	0.680***	0.651***	0.128**	0.185***
	(0.425)	(0.104)	(0.086)	(0.071)	(0.215)	(0.062)	(0.061)	(0.054)
IO_DOM	0.683***	0.734***	0.299***	0.075	0.257***	0.392***	0.047	0.030
	(0.174)	(0.034)	(0.051)	(0.063)	(0.078)	(0.029)	(0.047)	(0.056)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	No	No	No	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	No	No	No	No
Country fixed effects	Yes	Yes	Yes	Yes	No	No	No	No
R^2	0.26	0.80	0.26	0.57	0.71	0.97	0.73	0.92
Number of observations	143,726	164,510	72,350	69,431	143,726	164,510	72,350	69,431

Table 12
Foreign Institutional Ownership, Productivity, and Firm Value

This table shows estimates of firm-level panel regressions of productivity and firm valuation on foreign institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001-2010 period. The dependent variables are sales (*SALES*), foreign sales as a percentage of total sales (*FXSALES*), and Tobin's Q (*TOBIN_Q*). Regressions include additional control variables as in Table 3 (coefficients not shown). Variable definitions are provided in Appendix A. All explanatory variables are lagged by one year. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Pooled OLS			Fixed Effects		
Dependent variable	*SALES*	*FXSALES*	*TOBIN_Q*	*SALES*	*FXSALES*	*TOBIN_Q*
	(1)	(2)	(3)	(4)	(5)	(6)
IO_FOR	1.355***	0.596***	3.579***	0.438***	0.073***	0.899**
	(0.093)	(0.025)	(0.402)	(0.058)	(0.020)	(0.420)
IO_DOM	0.963***	0.054***	0.222	0.341***	0.023***	-0.301***
	(0.043)	(0.007)	(0.248)	(0.044)	(0.008)	(0.114)
log(*R&D_STOCK*)	0.004***			0.000		
	(0.001)			(0.002)		
log(*K*)	0.277***			0.170***		
	(0.008)			(0.010)		
log(*L*)	0.626***			0.405***		
	(0.012)			(0.018)		
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	No	No	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	No	No	No
Country fixed effects	Yes	Yes	Yes	No	No	No
R^2	0.83	0.28	0.37	0.97	0.82	0.69
Number of observations	171,327	170,107	160,729	171,327	170,107	160,729

Appendix A

Variable	Definition
R&D	Research and development expenditures (Worldscope item 01201) divided by total assets (Worldscope item 02999).
CAPEX	Capital expenditures (Worldscope item 04601) divided by total assets (Worldscope item 02999).
CAPEX+R&D	Sum of capital expenditures (Worldscope item 04601) and research and development expenditures (Worldscope item 01201) divided by total assets.
PATENTS	Number of patents applied by firm (USPTO).
EMPLOYEES	Number of employees (Worldscope item 07011).
STAFF_COSTS	Staff costs (Worldscope item 01084) divided by sales (Worldscope item 01001).
AVG_STAFF_COSTS	Staff costs in thousands of US$ (Worldscope item 01084) divided by number of employees (Worldscope item 07011).
SG&A	Selling, general and administrative expenses (Worldscope item 01101) divided by sales (Worldscope item 01001).
SALES	Sales in thousands of US$ (Worldscope item 01001).
TOBIN_Q	Total assets (Worldscope item 02999) plus market value of equity (Worldscope item 08001) minus book value of equity (Worldscope item 03501) divided by total assets (Worldscope item 02999).
CEO_TURNOVER	Dummy that equals one if the firm's CEO is terminated in a given year, and zero otherwise.
IO_TOTAL	Holdings (end-of-year) by all institutions as a fraction of market capitalization (FactSet/LionShares).
IO_FOR	Holdings (end-of-year) by institutions located in a different country from the where the stock is listed as a fraction of market capitalization (FactSet/LionShares).
IO_DOM	Holdings (end-of-year) by institutions located in the same country where the stock is listed as a fraction of market capitalization (FactSet/LionShares).
IO_FOR_US	Holdings (end-of-year) by U.S.-based foreign institutions as a fraction of market capitalization (FactSet/LionShares).
IO_FOR_NUS	Holdings (end-of-year) by non-U.S.-based foreign institutions as a fraction of market capitalization (FactSet/LionShares).
IO_COMMON	Holdings (end-of-year) by common law based institutions as a fraction of market capitalization (FactSet/LionShares).
IO_CIVIL	Holdings (end-of-year) by civil law based institutions as a fraction of market capitalization (FactSet/LionShares).
IO_INDEPENDENT	Holdings (end-of-year) by independent institutions (mutual funds and independent investment advisers) as a fraction of market capitalization (FactSet/LionShares).
IO_GREY	Holdings (end-of-year) by grey institutions (bank trusts, insurance companies, and other institutions) as a fraction of market capitalization (FactSet/LionShares).
INV_TURNOVER	Investment horizon (short- term vs. long-term) of the firm's institutional investors measured by the weighted average of the total portfolio churn rates of the firm's investors (Gaspar, Massa and Matos, 2005).
IO_FOR_ST	Holdings (end-of-year) by short-term (churn rate above the median) foreign institutions as a fraction of market capitalization (FactSet/LionShares).
IO_FOR_LT	Holdings (end-of-year) by long-term (churn rate below the median) foreign institutions as a fraction of market capitalization (FactSet/LionShares).
K/L	Net property, plant and equipment (Worldscope item 02501) divided by number of employees (Worldscope item 07011).
R&D_STOCK	R&D stock is defined as $G_t = R_t + (1 - \delta)\, G_{t-1}$ where R is the R&D expenditure in US$ in year t and $\delta = 0.15$, the private depreciation rate of knowledge.

CLOSE	Number of shares held by insiders (shareholders who hold 5% or more of the outstanding shares, such as officers and directors and immediate families, other corporations or individuals), as a fraction of the number of shares outstanding (Worldscope item 08021).
FXSALES	Foreign annual net sales (Worldscope item 07101) as a proportion of net sales (Worldscope item 01001).
GOV	Corporate governance index that measures the compliance with 41 governance attributes (RiskMetrics/ISS).
COMPETITION	Product market competition is measured as one minus the industry Lerner index, where the Lerner index equals the median gross profit margin (Worldscope item 08306) in a given three-digit SIC code.
FCF	Free cash flow equals net income before extraordinary items (Worldscope item 01551) plus depreciation (Worldscope item 04049) minus capital expenditures (Worldscope item 04601) divided by total assets (Worldscope item 02999).
LEVERAGE	Total debt (Worldscope item 03255) divided by total assets (Worldscope item 02999).
DIVIDENDS	Dividends (Worldscope item 04551) divided by total assets (Worldscope item 02999).
CASH	Cash holdings (Worldscope item 02001) divided by total assets (Worldscope item 02999).
PPE	Net property, plant and equipment (Worldscope item 02501) divided by total assets (Worldscope item 02999).
KZ_INDEX	Kaplan-Zingales index computed as $-1.002\times FCF+0.283\times TOBIN\_Q+3.319\times LEVERAGE-39.368\times DIVIDENDS-1.315\times CASH$.
AMIHUD	Amihud illiquidity measure calculated as the annual average of the daily ratio between a stock's absolute return and its dollar volume
RETURN	Stock return minus the local country market return denominated in US$.
ROA	Net income before extraordinary items (Worldscope item 01551) plus interest expenses (Worldscope item 01251) divided by total assets (Worldscope item 02999).
MSCI	Dummy that equals one if a stock is a member of the MSCI All Country World Index, and zero otherwise (Bloomberg/MSCI).

Internet Appendix to

"Are Foreign Investors Locusts?

The Long-Term Effects of Foreign Institutional Ownership"

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Matching between USPTO and Worldscope

This appendix describes the algorithm we follow in order to match patent assignees of the patents awarded by The United States Patent and Trademark Office (USPTO) to firms in the Worldscope database in the January 1990 to December 2012 period. Using historical data, for each firm in Worldscope, we compile the list of all names used by each firm currently and in the past (we use both "name" and "extended name" Worldscope variables), and we also collect each firm's country of incorporation. For each patent, we obtain the set of assignees listed on the patent grant publication document issued by the USPTO. For each assignee, USPTO provides assignee's country of domicile and the indicator of its type: "U.S. corporation", "non-U.S. corporation", "individual", "government agency", or other. To be used for matching, we require the patent to have at least one patent assignee indicated as a U.S. corporation or non-U.S. corporation.

In the first step of our matching algorithm, we standardize patent assignee names and Worldscope firm names using regular expression language. Our standardization focuses on three main aspects of assignee/firm names:

a) We ensure that assignee/firm name strings only contain a-z, A-Z, and 0-9 characters. For example, we replace "â" to "a", "ü" to "u", "Ó" to "O", "Ü" to "U", "È" to "E" etc. We do 292 such character replacements. We also remove multiple-character endings added to firm name strings by Thomson REUTERS data vendor for reasons unrelated to firm names. For example, "- ARD", "- CONSOLIDATED", "- PRO FORMA" etc. We use 46 regular expressions to perform these removals.
b) We unify the way suffices (that typically describe the legal form of incorporation) of firm names appear in the assignee/firm name strings. For example, German suffices "GmbH",

"G.M.B.H.", "G. M. B. H.", "g m b h", "G m b H", "G. m. b. H.", "G m. b. H" etc. are replaced by the same unified string "GMBH". There are 817 different suffices we process according to this scheme using regular expression language. This ensures that differences between assignee and firm name strings are not due to different ways in which suffices of firm names are recorded. To minimize the probability of mistakenly changing a non-suffix part of the firm name, this procedure is country-specific, i.e., we only make the above replacements if the respective suffice is used by firms incorporated in a given country.

We shorten non-unique parts of assignee/firm names that have low relevance for matching. For example, the word "CORPORATION" appears in many firm names and hence can be used to distinguish one firm name from another only marginally. Therefore, we abbreviate it to "CORP" taking into account all likely misspellings of this word, e.g., "COPRPORATION", "CORPOIRATION", "CORPORTATION", "COROPORTION", "CORPOORATION" etc. Another example is Japanese "KABUSHIKI KAISHA", which we abbreviate to "KAB KSHA" using regular expressions like "K[K]*ABUSH[IS]*KI[\.&-]*KAISH[I]*A", "KAB[UA]SHI[KN]I[\.&-]*[KH]AIS[HY]A" etc. Overall, we abbreviate 302 terms like "CORPORATION" using 1,212 different regular language expressions. This step makes unique elements of assignee/firm names longer relative to non-unique elements, which increases the efficiency of the fuzzy-string matching procedure. We describe this procedure next.

In the second step, we create a dataset that contains all pairwise combinations of standardized patent assignee name strings and standardized Worldscope firm name strings. There are 156,609 different standardized Worldscope firm name strings and 405,666 different standardized patent assignee name strings, leading to approximately 63.5 billion pairs. We match all assignee-firm name pairs using the Bigram string comparison algorithm. The Bigram algorithm compares two

strings using all combinations of two consecutive characters within each string. For example, the word “bigram” contains the following bigrams: “bi”, “ig”, “gr”, “ra”, and “am”. We coded the Bigram comparison function to return a value between 0 and 1, such that it counts the total number of bigrams that are common between the two strings divided by the average number of bigrams in the two strings. The Bigram algorithm is very effective for our purposes since it is fast, and handles very well misspellings, omission of characters, as well as the swapping of words in the string.

For assignee-firm name pairs with the Bigram score above 0.5, we also compute the Levenshtein distance between the two strings. Intuitively, the Levenshtein distance between two strings is the minimum number of single-character edits (specifically, insertion, deletion, and substitution of characters) required in order to change one string into the other. Using the Bigram score, Levenshtein distance, and the length of the two strings in the assignee-firm name pairs, we identify the closest Worldscope firm name for each patent assignee. Next, for each patent assignee, we decide whether the assignee was matched to a Worldscope firm or not based on a metric that combines the Bigram score with the Levenshtein distance. We also impose a condition that the firm’s country of incorporation obtained from Worldscope is the same as the assignee’s country of domicile recorded in USPTO data. These steps result in a database that uniquely links USPTO patent numbers to Worldscope firm codes.

We perform extensive checks on our standardization-matching algorithm. Specifically, first, to find closest matches, we use different thresholds for the Bigram score and the Levenshtein distance. Second, instead of standardizing suffices of firm names, we eliminate them from the firm name and we perform matching on so-called “stem” name. These alterations, even for rather extreme parameter values, have limited impact on the matching outcome: assignments of less

than 5% of patents in our data are affected. Last, using random subsamples of patents, we manually check the results of the standardization-matching algorithm and compute the Type I and Type II errors. We find that both errors are lower than 1%.

We do not have data on the list of subsidiaries owned by Worldscope firms at each point in time. For this reason, the patent portfolio we assign to firms in our sample might be smaller than the patent portfolio these firms effectively control. The robustness checks on the matching procedure we discuss above partially address this concern since names of subsidiaries are often very similar to names of their parent companies; typically, they share the unique part of the name like "SIEMENS" or "LAFARGE" for example.

For patents awarded to Worldscope firms that are incorporated in the US, we compare the outcome of our matching algorithm with the matching provided by the NBER Patent Data Project.[1] We first compile a link table between firm codes in Worldscope and GVKEYs in Compustat. Next, for Worldscope firms in our final regression sample where GVKEY is available, we compare the annual counts of patents in our data with that of the NBER Patent Data Project. Table A.1 provides four examples of firms with large patent portfolios: IBM, Microsoft, Honeywell, and Google. The table shows that, since the NBER dataset is based on patents awarded by USPTO up to 2006, the NBER data can represent innovation output (patents filed) only up to year 2002. In contrast, we use patent grant publication documents issued by the USPTO up to the end of June 2013, which allows us to have a representative measure of innovation output over our entire sample period. In the 2000-2002 period for which NBER data are available, patent counts in our data are comparable to that of the NBER data. Specifically, the last column of Table A.1 shows that the correlation coefficient between counts of patents in our

[1] See https://sites.google.com/site/patentdataproject/.

data and the NBER data is above 0.95 in the 2000-2002 period. Table A.2 shows, for each year in our sample, summary statistics that compare the distribution of the counts of patents in our data with that of the NBER data. We show that the two distributions are comparable in the 2000-2002 period for which NBER data are available.

Finally, we check to what extent the set of patents in our sample represent the entire set of USPTO patents awarded to all corporations (public as well as private) in each country. To this end, Table A.2 reports, for each country, the ratio of the number of patents matched to the Worldscope firms in our sample to the total number of patents assigned to corporations from the same country as indicated by USPTO. Overall, our "Non-U.S." sample contains 44% of patents awarded by USPTO to non-U.S. corporations in the 2000-2009 period.

Table IA.1
Comparison to NBER Patent Matching

This table shows, in each year, the total number of patents and the number of patents assigned to selected firms by our matching algorithm as well as the total number of patents and the number of patents assigned to the same firms according to the NBER dataset. Patents are counted toward years in which they were applied for with USPTO. The last column reports, in each year, the correlation between the total numbers of patents obtained in these two ways for U.S. firms in our sample.

	IBM		Microsoft		Honeywell		Google		Total		
Year	Matching	NBER Matching	Matching	NBER Matching	Matching	NBER Matching	Matching	NBER Matching	Matching	NBER Matching	Correlation with NBER Matching
2001	4,016	3,456	938	641	480	487	0	0	37,856	40,977	0.96
2002	3,547	2,361	1,127	474	570	501	0	0	38,057	34,102	0.95
2003	3,971	1,842	1,762	266	593	434	0	0	36,550	25,724	0.92
2004	3,730	802	2,918	321	746	286	0	2	35,857	12,738	0.85
2005	3,731	179	3,382	160	822	58	178	0	35,141	3,246	0.83
2006	3,691	6	2,050	10	741	3	193	0	31,906	182	
2007	5,252	0	1,664	0	728	0	249	0	30,722	0	
2008	6,937	0	1,174	0	684	0	229	0	27,117	0	
2009	2,223	0	566	0	312	0	205	0	16,258	0	
2010	807	0	290	0	140	0	165	0	8,736	0	

Table IA.2
Comparison to NBER Patent Matching: Summary Statistics

This table shows, for U.S. firms in our sample in each year, summary statistics of the number of patents assigned by our matching algorithm (column "BFMP Matching") and of the number of patents obtained from the NBER dataset (column "NBER Matching").

	Matching			NBER Matching		
Year	Mean	Standard Deviation	95th Percentile	Mean	Standard Deviation	95th Percentile
2001	6.38	80.11	13	6.91	73.63	14
2002	6.85	79.25	15	6.14	59.40	14
2003	7.07	87.11	14	4.98	47.91	12
2004	7.40	87.85	16	2.63	24.21	6
2005	7.30	88.26	15	0.67	6.24	2
2006	6.76	76.00	15	0.04	0.37	0
2007	6.59	89.41	14	0	0	0
2008	6.02	109.29	12	0	0	0
2009	3.88	42.53	10	0	0	0
2010	2.22	19.78	7	0	0	0

Table IA.3
Coverage of Patents by Country

This table shows, for each country, the number of patents matched to firms in our sample using "BFMP Matching" and the total number of patents assigned to firms (public and private) in the same country as reported by USPTO. USPTO Patents are based on the universe of utility patents issued by USPTO. Triadic Patents are based on patents that are simultaneously applied for with USPTO, EPO, and JPO.

		USPTO Patents			Triadic Patents		
Region	Country	Number of Matched Patents	Total Number of Patents	Coverage	Number of Matched Patents	Total Number of Patents	Coverage
North America	United States	298,200	789,978	38%	64,065	185,788	34%
	Canada	5,957	23,987	25%	949	4,812	20%
Europe	Germany	29,484	96,424	31%	9,895	38,025	26%
	France	8,767	32,297	27%	3,748	15,789	24%
	Netherlands	7,893	21,014	38%	6,702	12,447	54%
	Switzerland	5,759	17,781	32%	1,918	9,346	21%
	Finland	5,347	9,496	56%	1,349	2,719	50%
	Sweden	4,407	14,329	31%	1,759	6,619	27%
	United Kingdom	2,476	19,875	12%	1,734	8,244	21%
	Denmark	1,343	4,158	32%	834	1,956	43%
	Belgium	875	4,524	19%	621	2,497	25%
	Italy	751	11,726	6%	273	4,127	7%
	Norway	304	2,035	15%	111	710	16%
	Austria	231	3,339	7%	60	1,135	5%
	Ireland	12	2,238	1%	5	782	1%
	Spain	42	2,118	2%	25	838	3%
	Hungary	53	237	22%	42	134	31%
Asia Pacific	Japan	212,034	379,595	56%	80,275	127,350	63%
	South Korea	56,020	79,502	70%	9,291	12,467	75%
	Taiwan	41,147	60,837	68%	550	912	60%
	India	1,869	2,824	66%	1,162	1,553	75%
	Singapore	1,289	5,686	23%	90	679	13%
	China	752	12,356	6%	226	1,038	22%
	Australia	372	9,265	4%	133	5,031	3%
	Hong Kong	32	3,116	1%	6	237	3%
	New Zealand	77	832	9%	49	311	16%
	Malaysia	14	307	5%	4	70	6%
Other	Israel	825	8,151	10%	298	2,539	12%
	Brazil	192	662	29%	60	178	34%
	South Africa	17	520	3%	5	163	3%
	Non-U.S.	388,341	828,569	47%	122,174	262,708	47%
	All Countries	686,541	1,618,547	42%	186,239	447,496	42%

Table IA.4
Foreign Institutional Ownership and Long-Term Investment

This table shows estimates of firm-level panel regressions of R&D expenditures (Panel A) and capital expenditures (Panel B) on institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001-2010 period. The dependent variable is either the annual R&D expenditures as a percentage of assets (Panel A) or the annual capital expenditures (*CAPEX*) as a percentage of assets (Panel B). Regressions include the same control variables as in Table 3 (coefficients not shown). Variable definitions are provided in Appendix A. All explanatory variables are lagged by one year. For fixed-effects regressions of R&D a firm is required to have disclosed in its books R&D expenditures in at least one fiscal year. In addition, a firm must have at least two observations. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: R&D Expenditures

	Pooled OLS			Fixed Effects		
	(1)	(2)	(3)	(4)	(5)	(6)
IO_TOTAL	-0.007***			-0.014***		
	(0.002)			(0.004)		
IO_FOR		0.023***	0.021***		0.008*	0.008*
		(0.004)	(0.004)		(0.005)	(0.005)
IO_DOM			-0.011***			-0.019***
			(0.002)			(0.005)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	No	No	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	No	No	No
Country fixed effects	Yes	Yes	Yes	No	No	No
R^2	0.30	0.30	0.31	0.76	0.76	0.76
Number of observations	179,125	179,125	179,125	88,851	88,851	88,851

Panel B: Capital Expenditures

	Pooled OLS			Fixed Effects		
	(1)	(2)	(3)	(4)	(5)	(6)
IO_TOTAL	0.009***			0.012***		
	(0.001)			(0.003)		
IO_FOR		0.018***	0.019***		0.017***	0.017***
		(0.003)	(0.003)		(0.004)	(0.004)
IO_DOM			0.007***			0.011***
			(0.001)			(0.003)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	No	No	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	No	No	No
Country fixed effects	Yes	Yes	Yes	No	No	No
R^2	0.20	0.20	0.20	0.58	0.58	0.58
Number of observations	179,125	179,125	179,125	179,125	179,125	179,125

Table IA.5
Long-Term Effects of Foreign Institutional Ownership: Non-U.S. vs. U.S. Firms

This table shows estimates of firm-level panel regressions of long-term investment (Panel A) and innovation output (Panel B) on institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001-2010 period. The dependent variable is either the sum of annual capital expenditures (*CAPEX*) and R&D expenditures (*R&D*) as a percentage of assets (Panel A) or the logarithm of one plus the annual number of patents applied with the USPTO (Panel B). Columns (1)-(3) report the results for Non-U.S. firms and columns (4)-(6) report the results for U.S. firms. Regressions include the same control variables as in Table 3 (Panel A) or Table 4 (Panel B) (coefficients not shown). Variable definitions are provided in Appendix A. Variable definitions are provided in Appendix A. All explanatory variables are lagged by one year. For fixed-effects regressions of patents a firm is required to have made at least one patent application at USPTO. In addition, a firm must have at least two observations. Robust standard errors adjusted for country-year level (columns (1)-(3)) or industry-year level (columns (4)-(6)) clustering are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Long-Term Investment

	Non-U.S. Firms			U.S. Firms		
	(1)	(2)	(3)	(4)	(5)	(6)
IO_TOTAL	0.030***			0.006		
	(0.005)			(0.004)		
IO_FOR		0.031***	0.030***		0.067***	0.062***
		(0.005)	(0.005)		(0.018)	(0.017)
IO_DOM			0.031***			0.005
			(0.006)			(0.004)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	No	No	No
R^2	0.18	0.18	0.18	0.21	0.21	0.21
Number of observations	131,056	131,056	131,056	48,069	48,069	48,069

Panel B: Patent Counts

	Non-U.S. Firms			U.S. Firms		
	(1)	(2)	(3)	(4)	(5)	(6)
IO_TOTAL	0.232***			0.349***		
	(0.056)			(0.034)		
IO_FOR		0.623***	0.637***		2.757***	2.429***
		(0.076)	(0.076)		(0.321)	(0.311)
IO_DOM			-0.235***			0.280***
			(0.061)			(0.032)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	No	No	No
R^2	0.24	0.24	0.24	0.31	0.31	0.31
Number of observations	132,834	132,834	132,834	48,339	48,339	48,339

Table IA.6
Foreign Institutional Ownership and Innovation Output: Poisson Regressions

This table shows estimates of firm-level Poisson panel regressions of innovation output on institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001-2010 period. The dependent variable is the annual number of patents applied with the USPTO. Regressions include the same control variables as in Table 4 (coefficients not shown). Variable definitions are provided in Appendix A. All explanatory variables are lagged by one year. For fixed-effects regressions of patents a firm is required to have made at least one patent application at USPTO. In addition, to be included in firm fixed effects regressions a firm must have at least two observations. Robust standard errors adjusted for country-year level (columns (1)-(3)) or firm-level (columns (4)-(6)) clustering are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Pooled OLS			Fixed Effects		
	(1)	(2)	(3)	(4)	(5)	(6)
IO_TOTAL	0.808***			0.176**		
	(0.030)			(0.074)		
IO_FOR		1.805***	1.935***		0.772***	0.782***
		(0.178)	(0.190)		(0.164)	(0.164)
IO_DOM			0.611***			0.062
			(0.036)			(0.080)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	No	No	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	No	No	No
Country fixed effects	Yes	Yes	Yes	No	No	No
Number of observations	181,173	181,173	181,173	48,096	48,096	48,096

Table IA.7
Foreign Institutional Ownership and Innovation Output: Triadic Patents

This table shows estimates of firm-level panel regressions of innovation output, measured by triadic patent counts, on institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001-2010 period. The dependent variable is the logarithm of one plus the annual number of patents applied simultaneously with the three main patenting offices (USPTO, EPO and JPO). Regressions include the same control variables as in Table 4 (coefficients not shown). Variable definitions are provided in Appendix A. All explanatory variables are lagged by one year. For fixed-effects regressions of patents a firm is required to have made at least one patent application over the sample period. In addition, a firm must have at least two observations. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels.

	Pooled OLS			Fixed Effects		
	(1)	(2)	(3)	(4)	(5)	(6)
IO_TOTAL	0.175***			0.205***		
	(0.027)			(0.058)		
IO_FOR		0.358***	0.379***		0.222**	0.239**
		(0.055)	(0.056)		(0.112)	(0.111)
IO_DOM			0.151***			0.199***
			(0.031)			(0.066)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	No	No	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	No	No	No
Country fixed effects	Yes	Yes	Yes	No	No	No
R^2	0.2	0.2	0.2	0.73	0.73	0.73
Number of observations	181,173	181,173	181,173	20,833	20,833	20,833

Table IA.8
Foreign Institutional Ownership and Long-Term Investment: Robustness

This table shows estimates of firm-level panel regressions of long-term investment (*CAPEX+R&D*) on institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001-2010 period. The dependent variable is the sum of annual capital expenditures (*CAPEX*) and R&D expenditures (*R&D*) as a percentage of assets. Column (1) restricts the sample to the 2001-2008 period. Column (2) restricts the sample to the 2005-2010 IFRS adoption period. Column (3) controls for country-industry-year fixed effects. In column (4) the dependent variable is the sum of annual capital expenditures (*CAPEX*) and R&D expenditures (*R&D*) as a percentage of Sales. Regressions include the same control variables as in Table 3 (coefficients not shown). Variable definitions are provided in Appendix A. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
IO_FOR	0.042***	0.045***	0.041***	0.443***
	(0.007)	(0.006)	(0.006)	(0.047)
IO_DOM	-0.003	-0.000	-0.000	0.149***
	(0.002)	(0.003)	(0.002)	(0.015)
Year fixed effects	Yes	Yes	No	Yes
Industry fixed effects	Yes	Yes	No	Yes
Country fixed effects	Yes	Yes	No	Yes
Country-industry-year fixed effects	No	No	Yes	No
R^2	0.21	0.21	0.24	0.15
Number of observations	141,814	112,919	179,125	179,125

Table IA.9
Foreign Institutional Ownership and Innovation Output: Robustness

This table shows estimates of firm-level panel regressions of innovation output on institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001-2010 period. The dependent variable is the logarithm of one plus the annual number of patents applied with the USPTO. Column (1) restricts the sample to firms with at least one patent application in the sample period. Column (2) restricts the sample to the 2001-2008 period. Column (3) controls for country-industry-year fixed effects. In column (4) the dependent variable is the log of patent counts. In columns (5)-(7) the dependent variable is the patent counts using a three-year rolling window, patent counts scaled by the technological class, and patents counts three years in the future, respectively. In column (8) the dependent variable is the ratio of patent counts to R&D stock. Regressions include the same control variables as in Table 4 (coefficients not shown). Variable definitions are provided in Appendix A. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IO_FOR	1.300***	0.704***	0.629***	1.286***	0.826***	0.796***	0.641***	0.150***
	(0.181)	(0.100)	(0.091)	(0.214)	(0.109)	(0.105)	(0.101)	(0.019)
IO_DOM	0.280***	0.352***	0.348***	0.253***	0.474***	0.402***	0.319***	-0.021***
	(0.058)	(0.043)	(0.045)	(0.075)	(0.072)	(0.042)	(0.056)	(0.006)
Year fixed effects	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Country-industry-year fixed effects	No	No	Yes	No	No	No	No	No
R^2	0.30	0.29	0.31	0.34	0.31	0.26	0.28	0.04
Number of observations	48,096	143,463	181,173	24,815	181,173	181,173	120,532	85,370

Chapter III

Asset Management Within Commercial Banking Groups: International Evidence*

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1. Introduction

Mutual fund companies manage trillions of dollars, but many of these companies are not stand-alone entities. About 40% of mutual funds domiciled outside the United States are run by asset management divisions of groups whose primary activity is commercial banking. This phenomenon is less prevalent in the United States largely as a result of the Glass-Steagall Act, which kept banking and asset management as separate activities for many decades. However, since the repeal of Glass-Steagall by the Gramm-Leach-Bliley Act in 1999, many U.S. banking groups have developed asset management divisions.[1]

There are reports that bank-affiliated funds underperform funds operated by independent fund management companies, particularly in Europe (Financial Times (2011)), although there is little academic research about the potential spillover effects between the commercial banking and asset management divisions. While fund managers have a fiduciary responsibility to the fund's investors, managers are also employees of banking groups for which the revenue generated by bank lending usually dominates revenue from asset management.

In this paper, we examine the potential conflict of interest when fund management companies are owned by commercial banking groups, which may lead fund managers to benefit the bank's interests at the expense of fund investors.[2] Commercial banks may use affiliated funds to boost their voting rights and hence increase influence over the borrower's board of directors. This influence could help to build long-term relationships that lead to future loan business. In this case, we would expect affiliated funds to systematically overweight the stock of the bank's lending clients. Moreover, affiliated funds could also be used to temporarily support the stock

[1] As of the end of 2010, according to the Investment Company Institute (2011), mutual funds managed about $25 trillion. Equity funds had about $10 trillion in assets under management or 20% of the world market capitalization.
[2] See Mehran and Stulz (2007) for a review of the literature on conflicts of interest in financial institutions.

price of the bank's lending clients and hence gain the favor of the borrower's management.[3]

The alternative hypothesis (information advantage hypothesis) is that bank lending generates private information about borrowers via credit origination, monitoring, and renegotiation that is valuable for the affiliated fund manager. Thus, commercial banking groups gain an information advantage on their borrowing firms, which can have positive spillover effects for bank-affiliated funds. The null hypothesis (Chinese walls hypothesis) is that groups impose "Chinese walls" to prevent communication between the asset management and the lending divisions, so that bank-affiliated funds operate independently of other parent bank divisions.

We test these hypotheses using a comprehensive sample of open-end equity mutual funds domiciled in 28 countries over 2000-2010. We focus our tests on actively managed equity funds that invest in domestic equities because banks typically have stronger lending relationships with local firms. We identify the fund management company's ultimate owner to determine whether a fund is affiliated with a commercial bank. We define as "bank-affiliated" mutual funds that belong to a management company that is either majority-owned by a commercial parent bank or that is part of a group that owns a commercial bank. For example, funds managed by Wells Fargo Fund Management (the asset management arm of Wells Fargo & Co) and funds managed by DWS Investments (the asset management arm of Deutsche Bank) are classified as bank-affiliated. Fidelity Funds (parent company is FMR LLC, a stand-alone management company) and Pictet & Cie Funds (a Swiss private bank with no lending arm) are classified as unaffiliated.

We find that, on average, bank-affiliated funds underperform unaffiliated funds by about 70 basis points per year as measured by four-factor alphas. This result is consistent with the conflict

[3] Bank-run funds could also impact borrowing firms' stock volatility and liquidity. Assuming the equity-debt link as predicted by structural credit risk models (e.g., Merton (1974)), interventions on the stock would positively impact credit spreads in the secondary loan (and bond) market and the mark-to-market pricing of the loans on the bank's balance sheet.

of interest hypothesis, and holds when we use different risk-adjustment methods, samples, and regression specifications. We use fund fixed effects to address the concern that the decision to operate a fund management company as affiliated might be related to some unobserved fund characteristics that explain performance. We also use quasi-natural experiments (disinvestments of asset management divisions and regulatory reforms) to address the concern that past performance might affect the current organizational form of a management company.

There is a trade-off if the parent bank uses its affiliated funds to support their lending business by overweighting the stock of the bank's clients. On the one hand, using fund resources may help build long-term relationships with the borrowers and increase the likelihood of acting as lead arranger in future loans. Following Bharath, Dahiya, Saunders, and Srinivasan (2007, 2011) and Ferreira and Matos (2012), we show that banks are more likely to act as lead arrangers in loans when they exert control over borrowers by holding shares through their asset management divisions. Ownership by the banks's fund family increases both the probability of initiating a new lending relation and the probability of continuing an existing lending relation.

On the other hand, this biased portfolio allocation may impose a cost. If bank-affiliated funds underperform their peers, they can experience significant outflows and erosion of asset management revenues. Therefore, we expect affiliated management companies to be more conflicted when the benefits outweigh the costs, namely, when lending division revenue dominates asset management division revenue. We find that bank-affiliated funds underperform more when the ratio of outstanding loans to assets under management is higher. This evidence is consistent with the conflict of interest hypothesis.

To examine more directly whether the parent bank's lending activity is directly linked to fund underperformance, we measure the overlap between lending clients and fund stock holdings

using the parent bank's activity in the global syndicated loan market. A "client stock" is a firm that obtained a syndicated loan from the parent bank in the previous three years and whose shares are held in the portfolio of a fund affiliated with the parent bank. We show that bank-affiliated funds' portfolio holdings are biased toward client stocks over non-client stocks. We find that bank-affiliated funds with higher portfolio exposure to client stocks tend to underperform more. The results are robust when we measure the bank-affiliated fund's portfolio bias in excess of the average weight of peer funds and also when we restrict the analysis to the top ten parent bank lending clients.

We also consider alternative explanations for our results. It could be that bank-affiliated funds underperform because they have a captive investor clientele, as stand-alone fund providers find it difficult to establish a distribution network in countries where banks have a strong presence. Banks also have a competitive advantage in their brand recognition that allows them to cross-sell by offering mutual funds jointly with other financial products. Therefore, bank-affiliated funds could exploit their market power and charge higher fees, resulting in lower net-of-fees performance of bank-affiliated funds.[4] These alternatives are unlikely to explain our findings, because we find similar underperformance when we examine gross-of-fees returns and buy-and-hold returns based on portfolio holdings. Additionally, if investor clienteles were captive, we would expect flows to bank-affiliated funds to be less responsive to poor performance. We find, however, that flow-performance relationships do not differ significantly between bank-affiliated and unaffiliated funds.

To further rule out these alternative channels, we repeat the tests using placebo samples.

[4] A similar argument explains the underperformance of broker-sold mutual funds in the United States, which could result from conflicts of interest between brokers and their clients or from substantial non-tangible benefits offered by brokers (Bergstresser, Chalmers, and Tufano (2009)). Christoffersen, Evans, and Musto (2013) document other biases with broker-intermediated funds.

First, we find that index-tracking funds run by bank-affiliated management companies do not underperform unaffiliated funds. We would not expect significant conflicts of interest stemming from bank lending activity in the case of passive funds that have little discretion to overweight client stocks. Second, we find that the underperformance of bank-affiliated funds is much less pronounced for international funds than domestic funds. This is consistent with the idea that fund managers' portfolio decisions in international funds are less distorted by lending relationships, as any conflict should be more important in the case of local borrowers. Our results also do not appear to be driven by systematic differences in managerial skill between bank-affiliated and unaffiliated funds. Finally, we find less pronounced underperformance of affiliated funds for U.S. domiciled funds. This is consistent with the idea that "Chinese walls" between bank lending and asset management are more strictly enforced and fund investors' rights are better protected in the United States than elsewhere in the world (Khorana, Servaes, and Tufano (2005, 2009)).

Examination of year-by-year regressions reveals more pronounced conflicts of interest in bear-market periods when bank clients are more likely to benefit from stock price support. Fund managers' compensation incentives are more likely to dominate in bull markets, while employment incentives are more likely to dominate in bear markets when manager career concerns are higher. Thus, fund managers are more likely to be team players within the fund management company during periods of market downturns.[5]

We test more formally whether the price support to client stocks is concentrated in bear markets using calendar-time portfolios. The evidence shows that bank-affiliated funds tend to follow a contrarian (rather than a momentum) strategy on their client stocks. Additionally, the

[5] During bear markets net inflows into mutual funds are generally weak (Karceski (2002)) and fund family profitability is lower. Both effects lead to lower compensation incentives for fund managers in bear markets, as compensation is linked to fund size and fund family profitability (Farnsworth and Taylor (2006)). Moreover, the probability of job loss for fund managers is generally higher in bear markets (Chevalier and Ellison (1999)) when there are more fund closures and managers have fewer employment options (Kempf, Ruenzi, and Thiele (2009)).

strategy that goes long client stocks and shorts non-client stocks held by bank-affiliated funds produces negative abnormal returns in bear markets.

An important concern with our results is reverse causality. Past performance may affect the decision on whether to operate a fund management company as a bank-affiliated or stand-alone company. To strengthen the causal interpretation of the results, we exploit two quasi-natural experiments. The first consists of exogenous disinvestments of asset management divisions by commercial banking groups in the aftermath of the 2007-2009 financial crisis due to the need of banks to improve their regulatory capital ratios (The Economist (2009)). We find that funds that switch from bank-affiliated to unaffiliated due to these disinvestments subsequently reduce their holdings of client stocks, particularly their exposure to top lending clients. As a second identification strategy, we explore whether the fund regulatory overhaul mandated by the U.S. Securities and Exchange Commission (SEC) after the 2003 trading scandals reduced conflicts of interest in U.S. funds vis-à-vis non-U.S. funds. Using a difference-in-differences regression, we show that U.S. funds improve performance more than non-U.S. funds after the 2004 SEC reform, and this differential effect is more pronounced among bank-affiliated funds.

Our work contributes to the literature examining agency conflicts in fund complexes in U.S. markets (Massa (2003), Nanda, Wang, and Zheng (2004), Gaspar, Massa, and Matos (2006), Cohen and Schmidt (2009)). In particular, there is a recent line of research that studies spillover effects that other businesses have on asset management companies affiliated with financial groups. In the United States, Massa and Rehman (2008) find that bank-affiliated funds overweight lending client holdings around new loan announcements and that this strategy has a short-term positive effect on funds' performance. This evidence is consistent with the information edge hypothesis that bank-affiliated fund managers have access to private

information from their parent company. Other studies, however, find conflicts of interest within investment banks between their underwriting and asset management businesses (Ritter and Zhang (2007), Johnson and Marietta-Westberg (2009), Hao and Yan (2012), Berzins, Liu, and Trzcinka (2013)). Most recently, Sialm and Tham (2014) study the spillover effects across business segments of publicly traded fund management companies.

Our contribution is to study the effects of lending relationships on mutual fund performance within commercial banking groups. We use a worldwide sample, as commercial banks with affiliated asset management divisions are more prevalent outside the United States. Using Spanish data, Golez and Marin (2015) show that bank-affiliated funds support the prices of their own-parent stock and Gil-Bazo, Hoffman and Mayordomo (2015) show that bank-affiliated funds hold parent banks' bond issues after the onset of the 2007-08 financial crisis and European sovereign debt crisis. Ghosh, Kale, and Panchapagesan (2014) find conflicts of interest in business group affiliated funds in India. These papers, however, do not examine funds' holdings of lending clients. To the best of our knowledge, we are the first to provide evidence of conflicts of interest between the lending and equity asset management divisions within commercial banking groups.

2. Data

2.1 Sample of Equity Mutual Funds

Data on equity mutual funds come from the Lipper survivorship bias-free database, which covers many countries worldwide in the 1997-2010 period.[6] Although multiple share classes are listed as separate observations in Lipper, they have the same holdings and the same returns before

[6] Ferreira, Keswani, Miguel, and Ramos (2013) and Cremers, Ferreira, Matos, and Starks (2015) provide a detailed description of this data source. Lipper's worldwide data coverage is comprehensive when compared to aggregate statistics from the Investment Company Institute (2011).

expenses. Thus, we keep the primary share class as our unit of observation, and aggregate fund-level variables across different share classes. We exclude funds-of-funds, closed-end funds, and index tracking funds, which reduces the sample to 38,400 open-end actively managed equity funds (23,653 funds that managed over $7.5 trillion as of December 2010).

To classify each mutual fund as either affiliated or unaffiliated with a commercial bank, we follow two steps. First, we collect information on each fund's ultimate owner from FactSet/ LionShares. In order to do this, we match each Lipper fund with the fund's portfolio holdings data provided by LionShares using ISIN and CUSIP fund identifiers, as well as management company and fund names.[7] Second, we match the fund's ultimate parent obtained from LionShares with the ultimate owners of banks from the Bureau van Dijk's BankScope database. A fund is classified as bank-affiliated if: (1) the fund's ultimate owner is a commercial bank (the entity is classified in BankScope as either *Bank Holding & Holding Companies*, *Cooperative Bank*, *Commercial Bank*, *Savings Bank*, or *Specialized Governmental Credit Institution*) with total assets over $10 billion; or (2) there is a commercial bank within the fund's ultimate owner group.[8] After the match, the sample includes 19,969 funds (13,801 funds that managed $6.9 trillion as of December 2010).

For our main tests, the sample includes a total of 7,220 domestic funds in 28 countries over the 2000-2010 period. We focus on domestic funds (i.e., funds that invest in their local market), but we also perform placebo tests using international funds and index-tracking funds. Table 1 presents the number and total net assets (TNA) of the sample of domestic funds by country as of December 2010. There are 4,981 domestic funds that managed $3.6 trillion of assets in 2010.

[7] While the Lipper data are survivorship bias-free, the LionShares data provide only the current header on the fund's ultimate owner. Therefore, we use historical ultimate owner information from LionShares backfiles to capture changes on the funds' ultimate owner due to mergers and acquisitions in the financial industry.

[8] For insurance groups, we consider only commercial bank subsidiaries with significant assets relative to the total assets of the group. For example, funds affiliated with Allianz SE are not considered bank-affiliated.

Funds affiliated with a commercial banking group represent 32% of the number of funds and 18% of TNA. There is considerable variation in the market share of bank-affiliated funds across countries. While bank-affiliated funds represent only 11% of TNA in the United States, they represent 40% outside the United States. The market share of bank-affiliated funds exceeds 50% of TNA in the majority of continental European countries such as Germany, Italy, Spain, and Switzerland. Figure 1 shows the time series of the number and TNA of unaffiliated and affiliated funds, where we see a downward trend in the share of affiliated funds.

Table IA.1 in the Internet Appendix provides a list of the top five fund management companies per country and whether they are bank affiliated. In the United States, none of the top five fund companies is part of a commercial banking group, while in major countries in continental Europe most of the top five fund companies are bank affiliated.

2.2 Measuring Risk-Adjusted Performance

We estimate the fund's risk-adjusted returns (alphas) in U.S. dollars using the Carhart (1997) four-factor model. Following Bekaert, Hodrick, and Zhang (2009), we estimate four-factor alphas using regional factors based on a fund's investment region in the case of domestic, foreign country, and regional funds. We use world factors in the case of global funds.[9]

For each fund-quarter, we estimate factor loadings using the previous 36 months of return data (we require a minimum of 24 months of return data) using the regression:

$$R_{i,t} = \alpha_i + \beta_{1i} MKT_{i,t} + \beta_{2i} SMB_{i,t} + \beta_{3i} HML_{i,t} + \beta_{4i} MOM_{i,t} + \varepsilon_{i,t} \qquad (1)$$

where R_{it} is the return in U.S. dollars of fund i in month t in excess of the one-month U.S.

[9] We construct country-level factors using individual stock returns in U.S. dollars obtained from Datastream, following closely the method of Fama and French (1993). The regional and world factors are value-weighted averages of country factors. The regions are Asia Pacific, Europe, North America, Emerging Markets, and World. Ferreira, Keswani, Miguel, and Ramos (2013) provide a detailed description of the factors

Treasury bill rate; $MKT_{i,t}$ (market) is the excess return on the fund's stock investment region in month *t*; $SMB_{i,t}$ (small minus big) is the average return on the small-capitalization stock portfolio minus the average return on the large-capitalization stock portfolio in the fund's investment region; $HML_{i,t}$ (high minus low) is the difference in return between the portfolio with high book-to-market stocks and the portfolio with low book-to-market stocks in the fund's investment region; $MOM_{i,t}$ (momentum) is the difference in return between the portfolio with the past 12-month stock winners and the portfolio with the past 12-month stock losers in the fund's investment region. Next, using the estimated factor loadings, we subtract the expected return from the realized fund return to obtain the fund's abnormal return in each quarter (alpha). In an alternative approach, we perform robustness checks using benchmark-adjusted returns (i.e., the difference between the fund's return and the return on its benchmark).

2.3 Measuring Conflicts of Interest

We use several proxies for conflicts of interest within the commercial banking group based on the relative importance of the lending and asset management divisions. First, we use the ratio of the parent bank's total loans outstanding from BankScope over the total net assets (TNA) managed by the asset management division (*Loans/TNA*). Second, we use the ratio of total syndicated loans outstanding arranged by the parent bank from DealScan over the TNA (*Syndicated Loans/TNA*). Finally, we use the ratio of the U.S. dollar value of all-in drawn interest rate spreads (including fees) on outstanding syndicated loans over the total annual U.S. dollar value of fees of the asset management division (*Lending/Asset Mgmt. Revenues*).[10]

To test more directly the lending channel, we use fund holdings data to analyze whether the

[10] The TNA is given by the sum of all open-end active domestic equity funds managed by the management companies owned by the parent bank.

portfolio choices of bank-affiliated funds are biased toward client stocks. We obtain data on funds' portfolio holdings from the LionShares database.[11] We classify each fund's holdings as either a lending client stock or non-client stock using the Thomson Reuters Dealscan database, which provides information on the global syndicated loan market. We use all loans initiated between 1997 and 2010 with facility amounts above $25 million. A fund's stock holding is classified as a client stock if the fund's parent bank, subsidiary or branch acted as lead arranger for the firm's loans in the previous three years. To measure the intensity of the bank-firm relationship we define an additional measure that classifies a stock holding as a client stock only if a firm is among the top ten borrowers of the fund's parent bank in terms of the total amount of syndicated loans in the previous three years.

To better understand how fund portfolio holdings are classified as client or non-client stocks, consider the following example of two selected funds (as of December 2010):

DWS Investa Fund				JPMorgan U.S. Equity Fund			
Ultimate Owner	Deutsche Bank AG			Ultimate Owner	JPMorgan Chase & Co.		
Management Company	DWS Investments			Management Company	JPMorgan Asset Mgmt.		
Country of Domicile	Germany			Country of Domicile	United States		
Fund Benchmark	DAX 30 TR			Fund Benchmark	S&P 500 TR		
Number of Holdings	43			Number of Holdings	217		
%TNA in Client Stocks	56.9			%TNA in Client Stocks	40.4		
Bias in Client Stocks (%)	11.6			Bias in Client Stocks (%)	11.0		
Top 5 Holdings:				Top 5 Holdings:			
Stock	Country	Client	Weight (%)	Stock	Country	Client	Weight (%)
BASF SE	Germany	Yes	10.92	Apple	U.S.	No	3.70
Siemens AG	Germany	Yes	9.81	Exxon Mobil	U.S.	Yes	2.51
Daimler AG	Germany	Yes	7.72	Microsoft	U.S.	Yes	2.42
E.ON SE	Germany	Yes	5.35	Procter & Gamble	U.S.	Yes	2.19
Allianz SE	Germany	No	4.46	Chevron	U.S.	No	2.07

In the first case, the DWS Investa fund, which is domiciled in Germany, invests primarily in domestic firms and is managed by DWS Investments (the asset management arm of Deutsche

[11] Ferreira and Matos (2008) provide a detailed description of this database.

Bank). Deutsche Bank acted as lead arranger in the syndicated loan market over the previous three years for BASF, Siemens, Daimler, and E.ON, which are among the top five fund holdings of DWS Investa. Overall, 56.9% of the fund's TNA is invested in client stocks, which corresponds to an overweight of 11.6 percentage points compared to peer funds. The second example is the JPMorgan U.S. Equity Fund, which is domiciled in the United States and is managed by JPMorgan Asset Management (the asset management division of JPMorgan Chase & Co). Three of its top five holdings are classified as client stocks for which JPMorgan acted as lead arranger over the previous three years. The fund has 40.4% of its TNA invested in client stocks, corresponding to an overweight of 11.0 percentage points compared to peer funds.

We construct several variables based on client stocks. First, we measure the fund's investment in client stocks as a percentage of TNA (*%TNA Invested in Client Stocks*). Second, we measure whether a bank-affiliated fund overweights client stocks compared to peer funds with the same benchmark (*Bias in Client Stocks*).[12] We also compute both measures using only the holdings of the top ten borrowers of the parent bank (*%TNA Invested in Top 10 Client Stocks*, *Bias in Top 10 Client Stocks*). Finally, for some of the falsification tests, we measure the fund bias on client stocks not held by computing the average weight in the stocks of lending clients that are not held by the fund (*Bias in Client Stocks Not Held*, *Bias in Top 10 Client Stocks Not Held*).

2.4 Summary Statistics

Panel A of Table 2 reports summary statistics on funds' risk-adjusted performance, bank-affiliated dummy, and other proxies for conflicts of interest, as well as fund-level control variables (*Fund TNA*, *Fund Family TNA*, *Age*, *Total Expense Ratio*, *Total Load*, *Fund Flow*, *Nr.*

[12] In unreported tests, we find similar results if we define these ratios in terms of number of shares held, rather than TNA.

of Countries of Sale, *Team Managed Dummy*, *Past Performance*). Table A.1 in the Appendix provides variable definitions.

Panel B of Table 2 reports the sample means of the variables separately for unaffiliated and affiliated funds as well as univariate tests of the equality of coefficients between the groups. Panel C of Table 2 reports summary statistics on the proxies for conflicts of interest in bank-affiliated funds. The average *Loans/TNA* is above 100 with a median of 22.75. The average *Syndicated Loans/TNA* is 17.1 with a median of 4.2. On average, affiliated funds have about 15% of their holdings in client stocks, which corresponds to 6.5 percentage points more than peer funds hold of the same stocks.

Deutsche Bank is a good example of a commercial banking group with a large asset management division, DWS Investments. Deutsche Bank was the second-largest commercial bank worldwide, with total assets of $2,500 billion (outstanding loans of $545 billion), and second in the league table of syndicated loan arrangers in Europe with $183 billion in 2008-2010. DWS is the largest fund management company in Germany and the third-largest in Europe, with TNA of $90 billion in equity funds ($24 billion in domestic equity funds). Thus, the lending business is several times the size of the asset management business. DWS funds' equity holdings show a strong average bias to client stocks, with 25% of TNA invested in client stocks compared to 17% among their peer funds.

3. Performance of Bank-Affiliated Funds

3.1 Baseline Test

We start by comparing the performance of bank-affiliated funds relative to unaffiliated funds. We estimate fund-quarter panel regressions of four-factor alphas on the commercial bank-

affiliated dummy variable and a set of control variables (measured with a one-quarter lag). The regressions include quarter fixed effects and country of domicile fixed effects. Standard errors are clustered at the ultimate-owner level.

The main results are reported in Table 3. Column (1) of Table 3 shows that bank-affiliated funds underperform unaffiliated funds, as indicated by the negative and significant bank-affiliated dummy coefficient. The effect is economically significant. Using four-factor alphas, affiliated funds underperform by about 17.5 basis points per quarter (which corresponds to about 70 basis points per year). The coefficients on the control variables are in line with other studies that find that performance is negatively related to fund size and total expense ratio, but positively related to family size and flows (e.g., Chen, Hong, Huang, and Kubik (2004)).

To investigate further why commercial bank-run funds underperform, we replace the bank-affiliated dummy with the variables *Loans/TNA*, *Syndicated Loans/TNA*, and *Lending/Asset Mgmt. Revenues*, which measure the relative size of the lending division versus the asset management division within a banking group. Columns (2), (3), and (4) show negative and statistically significant coefficients on these three variables. We conclude that the underperformance of bank-affiliated funds is more pronounced when the lending activity dominates the asset management division.[13]

A legitimate concern with our results so far is an omitted-variables problem. To address this concern, we include fund fixed effects in our regressions to control for unobserved sources of fund heterogeneity. By using fund fixed-effects regressions, we analyze only the within-fund changes in the bank-affiliated dummy (i.e., disinvestments or acquisition of asset management divisions by banking groups in which the other party is not a commercial banking group). This

[13] These effects are economically significant. For example, a one-standard deviation increase to the proxy for conflicts of interest, *Loans/TNA*, is associated with a decline in four-factor alphas of 10 basis points per quarter.

solves a "joint determination" problem in which an unobserved fund-level time-invariant variable determines both performance and affiliation with a banking group.

Columns (5)-(8) of Table 3 report our main results using a fund fixed-effects model. There is a significant negative relation between performance and the bank-affiliated dummy (column (5)). The affiliated funds underperformance gap relative to unaffiliated funds is 28.3 basis points per quarter, which is stronger than the estimate in column (1). Because this specification focuses on the effects of within-fund changes in bank affiliation, fund-specific omitted variables cannot explain the observed relation between bank affiliation and performance. Moreover, columns (6)-(8) of Table 3 show negative and significant coefficients on the measures of the relative size of the lending and asset management divisions are, with the exception of the *Syndicated Loans/TNA* variable, which is estimated with less precision.

We also explore the time series by running our baseline regression year-by-year. Figure 2 plots the evolution of the coefficients on the bank-affiliated dummy and our three proxies for conflict of interests (*Loans/TNA*, *Syndicated Loans/TNA*, and *Lending/Asset Mgmt. Revenues*) over the sample period. The left top panel shows the coefficient on the bank-affiliated dummy. The underperformance of bank-affiliated funds was more pronounced in the 2000-2002 period (the dot-com bubble burst); underperformance lessened during the 2003-2006 bull market, but again became more pronounced during the 2007-2009 financial crisis. The other panels of Figure 2 show that coefficients on the more direct proxies for conflicts of interest follow a similar time pattern. The evidence suggests that conflicts of interest are more pronounced in bear market periods when we expect bank clients to need more stock price support.[14]

[14] We test this more formally running multivariate regressions on affiliated funds' performance gap in market downturns (as proxied by the bear market dummy or the market return of fund's geographic focus region). The estimates in Table IA.2 in the Internet Appendix show that the underperformance of affiliated funds is more pronounced during market downturns.

3.2 Benefits to the Bank

We examine the trade-off between the lending and asset management divisions when the parent bank uses its affiliated funds to support their lending business by overweighting the stock of the bank's clients. On the one hand, this biased portfolio allocation may impose a cost as the affiliated funds may underperform their peers and therefore experience significant outflows and erosion of asset management revenues. On the other hand, using fund resources may help build long-term relationships with the borrowers and increase the likelihood of the bank acting as lead arranger in future loans.

We start by examining whether affiliated fund holdings in lending client stocks (borrowing firms) makes it more likely that the bank will be chosen as a lead arranger for future loans.[15] To perform this test, we follow a methodology similar to Bharath, Dahiya, Saunders, and Srinivasan (2007, 2011) and Ferreira and Matos (2012). For each facility, we pair borrowing firms with each of the top 20 banks in a country in terms of loan volume in U.S. dollars. We then estimate a logit model in which the dependent variable is a dummy variable that takes the value of 1 if the bank acted as a lead arranger and zero otherwise.

Table 4 reports the results. The results in column (1) indicate that commercial banks tend to obtain more loans from firms in which their affiliated funds hold stock (*Fund Ownership Dummy*). On average, banks that hold stock of the borrower firms are 3.2% more likely to be chosen as lead arrangers than banks without affiliated institutional holdings in borrower firms (the probability increases from 12.6% to 15.8%). The relative importance of affiliated fund holdings to increase the bank's lending business depends on whether or not the bank has already

[15] Conflicts of interest between bank's asset management and lending divisions are not unnoticed in the mutual fund industry. In a recent article (Financial Times, 2011), Guillaume Prache, managing director of the European Federation of Investors, stated: "*Banks tend to double up their shares, combining the ones they hold directly with the proxy votes from shares owned by asset management arms. Banks invariably vote in ways that suit their commercial lending or investment banking arms, not in ways that reflect the interests of end-investors*".

a past lending relationship (over the preceding three years) with the borrower firm. While for new lending relationships, holding affiliated institutional holdings in the borrower stock, increases the likelihood of the bank being chosen as lead arranger by 2.6% (the probability increases from 9.4% to 12%), for past lending relationships, banks are 6.6% more likely to be chosen as lead arrangers (the probability increases from 41.3% to 47.9%).

It is likely that the probability of the bank being chosen as lead arranger increases with the size of the affiliated funds ownership in the borrowing firm. Thus, we repeat our analysis using a dummy that takes the value of one if the bank's affiliated funds, on aggregate, hold at least 1% of the borrowing firm's shares. The results in column (3) show that, on average, banks that hold at least 1% of the borrower firm's shares are 4.6% more likely to be chosen as lead arrangers than banks that hold less than 1% of the firm's shares. While for new relationships the probability of being chosen as lead bank increases by 3.7% for past lending clients this probability increases by 8.6%.

Columns (3) and (4) show that the results are robust when we include bank fixed-effects, bank-specific controls (assets, return on assets) and borrower-specific controls (market capitalization, book-to-market ratio, leverage, tangibility, stock volatility, and stock return).

In short, we find that banks are more likely to act as lead arrangers in loans when they exert control over borrowers by holding stock through their asset management divisions. Ownership by the lender's fund family increases both the probability of initiating a new lending relation and amplifies the probability of continuing a past lending relationship with lending clients.

3.3 Alternative Explanations

There are alternative hypotheses that could explain why bank-affiliated funds underperform unaffiliated funds. A first alternative hypothesis is that funds affiliated with commercial banking

groups must offer competitive compensation packages to attract top talent in fund management. Our regression tests already control for other factors that could explain the underperformance of bank-affiliated funds such as manager skill. To control for different organizational structure or managerial skill we use the *Team Managed Dummy* variable. If fund managers' personal names are featured, then career concerns are higher and the portfolio manager may be more reluctant to be a "team player" and cooperate with the fund family strategy.[16]

A second alternative hypothesis is that bank-affiliated funds underperform because they have a captive investor clientele that is less sophisticated (Frye (2001)).[17] We control for this alternative in our baseline regressions using several proxies (*Total Expense Ratio*, *Total Loads*, *Number of Countries of Sale*). To further rule out the investor clientele explanation, we implement three additional tests.

The first strategy is to run our regressions using gross-of-fees returns by adding back expense ratios. Table 5 reports the results. Column (1) of Table 5 shows that bank-affiliated funds underperform unaffiliated funds when we use gross returns. The extent of the performance gap remains practically unchanged at 17.3 basis points per quarter. The coefficients on the other proxies of conflicts of interest in columns (2)-(4) of Table 5 are also negative and significant. This result suggests that the ability of bank-affiliated funds to charge higher expense ratios does not explain the underperformance of affiliated funds.

The second strategy consists of estimating our regressions using the funds' buy-and-hold return in excess of the benchmark return, as the performance gap could come from higher loads,

[16] In the U.S. mutual fund industry, Massa, Reuter, and Zitzewitz (2010) study the choice between named and anonymous management. These authors show that funds with named managers are less likely to engage in cross-fund subsidization (Gaspar, Massa, and Matos (2006)).

[17] This argument is similar to that of Del Guercio and Reuter (2014) for why U.S. retail mutual funds sold through brokers face weaker incentives to generate alpha than mutual funds sold directly. These authors build their work on the prior findings by Bergstresser, Chalmers, and Tufano (2009) and Christoffersen, Evans, and Musto (2013).

wrap fees, and other hidden costs. The results are reported in columns (5)-(8) of Table 5. We continue to find that bank-affiliated funds underperform unaffiliated funds by a similar difference at 15.6 basis points per quarter. Results for the other three proxies of conflicts of interest are also robust.

The third strategy is to estimate the sensitivity of fund flows to past fund performance (e.g., Sirri and Tufano (1998), James and Karceski (2006)). In each quarter and country, fractional performance ranks ranging from zero (poorest performance) to one (best performance) are assigned to funds according to their returns in the past four quarters. We estimate both a linear regression using the performance ranks (*Rank*) and a piecewise linear regression with three performance rank segments: $Low_{i,t-1} = \min(0.2, Rank_{i,t-1})$, $Mid_{i,t-1} = \min(0.6, Rank - Low_{i,t-1})$, and $High_{i,t-1} = Rank - (Low_{i,t-1} + Mid_{i,t-1})$. We then test whether the sensitivity of flows to past performance is statistically different between affiliated and unaffiliated funds by including interaction variables of the *Bank-Affiliated Dummy* with Rank or with *Low*, *Mid*, and *High*.

Table 6 reports the results. Column (1) shows the estimates of the linear specification and column (2) of the piecewise linear specification. The interaction variable coefficients with the bank-affiliated dummy are statistically insignificant in both columns (1) and (2). Thus, there is no evidence that the clientele of bank-affiliated funds is less responsive to fund performance and exerts less monitoring efforts.

3.4 Placebo Tests

We also perform falsification tests of our main results using alternative samples of funds. First, we use index-tracking funds, because we expect that bank-affiliated fund managers of passive products do not have discretion to overweight client stocks. These index fund managers have

their "hands tied" in terms of portfolio holdings as they need to closely follow a benchmark. Panel A of Table 7 reports the results of these falsification tests using the bank-affiliated dummy and the three other proxies for conflicts of interest. Columns (1)-(4) of Table 7, Panel A, show the results for the sample of index-tracking funds. The coefficient on the bank-affiliated dummy is statistically insignificant. As expected, we do not find evidence of conflicts of interest with the lending division in the sample of passive funds.

We also use international equity funds (i.e., funds that invest outside their local market) because we expect bank lending relationships to be less important in the international syndicated loan market than in the domestic market. Columns (5)-(8) of Table 7, Panel A, show the results for the sample of international funds. The performance gap between bank-affiliated and unaffiliated funds is statistically insignificant in column (5) and weakly significant in columns (6)-(8). The results support a conclusion that the source of underperformance of bank-affiliated domestic funds seems to be the conflict of interest, which is stronger for the local bank lending activity, rather than inherent differences in skill across bank-affiliated and unaffiliated funds.

Panel B of Table 7 presents the results of an additional test that compares the underperformance of bank-affiliated funds in the United States versus other countries. The intuition is that "Chinese walls" between bank lending and asset management are more strictly enforced in the United States due to the legacy effect of the Glass-Steagal Act and stronger fund investors' rights. In columns (1) and (5) of Table 7, Panel B, we find much less pronounced underperformance by bank-affiliated U.S. funds (11.9 basis points per quarter) than for non-U.S. funds (24.9 basis points per quarter). The difference between U.S. and non-U.S. funds is even more striking in columns (3) and (4) versus columns (7) and (8) when we use other proxies for conflicts associated with lending (*Syndicated Loans*/*TNA*, *Lending*/*Asset Mgmt. Revenues*). This

indicates that conflicts of interest are more pronounced in markets with weaker fund regulation.

4. Portfolio Holdings Tests

4.1 Fund Performance

We next use portfolio holdings data to test more directly whether fund manager investment decisions favor the parent bank's lending business over the interests of fund investors. In particular, we assess the cost from the portfolio exposure to client stocks.

Panel C of Table 2 shows that bank-affiliated funds hold, on average, about 14.9% of the fund's TNA in client stocks (*%TNA Invested in Client Stocks*). This compares with about 8.5% when we consider the average weight on the same stocks among peer funds (i.e., funds that track the same benchmark). This corresponds to a 6.5 percentage point overweighting of client stocks by bank-affiliated funds relative to peer funds (*Bias in Client Stocks*). The allocation bias to client stocks is 0.44 percentage points when we consider the top ten borrowers of the fund's parent bank (*Bias in Top 10 Client Stocks*).[18]

The fact that fund managers have biased allocations toward client stocks does not necessarily imply that these portfolio choices are detrimental to performance, as funds might have acquired private information through the lending business. To test which hypothesis (conflicts of interest or information edge) dominates, we estimate our baseline regressions of fund performance using these more direct portfolio holdings measures.

Table 8 presents the results. Columns (1) and (3) show negative and statistically significant coefficients on both *%TNA Invested in Client Stocks* and *%TNA Invested in Top 10 Client Stocks*. The effects are also economically significant. For example, a one-standard deviation increase in

[18] We also find that affiliated funds overweight client stocks using fund-stock-quarter regression tests (see Table IA.3 in the Internet Appendix).

the affiliated fund's allocation to client holdings is associated with a decline in performance of 8 basis points per quarter (11 basis points in the case of top ten clients). This explains about half the size of the bank-affiliated dummy in the baseline tests in Table 3. The evidence shows that bank-affiliated funds with greater portfolio exposure to client stocks tend to underperform more, which supports the conflicts of interest hypothesis.

Next, we re-estimate our regressions when we measure the bank-affiliated fund's excess allocations to client stocks over peer funds. We find negative and statistically significant coefficients on both *Bias in Client Stocks* and *Bias in Top 10 Client Stocks*. For example, a one-standard deviation increase in the bias in client holdings is associated with a decline in performance of 4 basis points per quarter (10 basis points in the case of top ten clients).

Figure 3 reports the yearly estimates of the coefficients on *%TNA Invested in Client Stocks*, *%TNA Invested in Top 10 Client Stocks*, *Bias in Client Stocks*, and *Bias in Top 10 Client Stocks*. The results are robust when we use gross returns (Panel B) and buy-and-hold returns (Panel C) as dependent variables.

We also conduct a falsification test using portfolio holdings. We investigate whether the excess allocation to client stocks not held by affiliated funds produces the same results as the client stocks held. For this test, we use the average weights by peer funds on client stocks not held by the affiliated fund. Table 9 reports the results.

We find that the coefficient on *Bias in Top 10 Client Stocks Not Held* is positive and statistically significant, but the coefficient on *Bias in Client Stocks Not Held* is statistically insignificant. The conclusion is that funds would have outperformed had they held these stocks. These results show that affiliated funds are more biased toward the worse-performing client stocks within the investable universe of stocks of their lending clients. This is consistent with the

price support hypothesis.

4.2 Calendar-Time Stock Portfolios

As an alternative approach, we use calendar-time portfolios to study how much of the bank-affiliated funds' underperformance is due to portfolio allocation to client holdings. At the beginning of each quarter, we assign stock holdings of bank-affiliated funds to client or non-client portfolios. Stocks are weighted by the fund's U.S. dollar holdings, and portfolios are rebalanced every calendar quarter. We then compute value-weighted monthly returns by averaging across funds, weighting individual fund portfolios by the fund's TNA at the end of the previous quarter. This approach has the advantage of corresponding to a simple investment strategy of investing in client and non-client securities in proportion to the amount held by the universe of affiliated funds.[19]

We analyze the risk-adjusted returns of calendar-time portfolios using the four-factor model. Since Figure 2 suggests that there is some time-series variation in bank-affiliated funds' price support to client stocks, we define as bear markets the years associated with the dot-com bubble burst (2000, 2001, 2002) and the global financial crisis (2008, 2009). We expect client firms to need more price support from bank-affiliated funds in bear markets (i.e., when the majority of stock prices drop substantially).

Table 10 shows the results. The strategy of going long affiliated funds' client stocks has a negative factor loading on momentum (*MOM*), while the factor loading on momentum for the portfolio of non-client stocks is statistically insignificant. This suggests that bank-affiliated funds tend to follow a contrarian strategy, which is evidence of price support of the parent bank's client

[19] These tests measure buy-and-hold returns and are not able to pick-up the effect of any interim trading between quarter ends.

stocks. Additionally, the zero-cost strategy that goes long client stocks and short non-client stocks held by bank-affiliated funds earns 12 basis points per month in bull markets (the intercept of the regression is the alpha in bull markets), but the estimate is statistically insignificant. The *BEAR* dummy coefficient is -0.344 and statistically significant indicating that the long-short strategy returns are different in bear markets and bull markets. The long-short strategy loses 23 basis points (= 0.119 – 0.344) per month in bear markets, which suggests that, during market downturns, price support activities of client stock holdings have an adverse effect on the wealth of bank-affiliated funds' investors.[20]

5. Identification and Robustness

An important concern with our results is reverse causality. Strong past performance may prompt a fund management company to operate as unaffiliated, while poorly performing funds may not be able to operate as stand-alone. Another concern is the possibility of confounding effects. In order to strengthen the causal interpretation of the effect of a fund affiliation with a commercial banking group, we exploit variation generated by two quasi-natural experiments.

5.1 Disinvestment of Asset Management Divisions

The first identification strategy uses asset management division disinvestments by commercial banking groups to identify changes in fund bank affiliation that are exogenous to fund performance. While disinvestment decisions of fund management companies in general are not exogenous, we focus our analysis on the eight quarters of the global financial crisis period from 2007:Q3 through 2009:Q2. During this period, several commercial banking groups were forced to divest non-core business assets to improve their regulatory capital ratios (The Economist

[20] In untabulated tests, we find similar results when we allow the loadings on the four factors to shift with the market regime using an interaction with the bear market dummy.

(2009)) rather than for other factors such as fund underperformance. Some high-profile deals include the divestitures of the asset management division of Credit Suisse to Aberdeen, Barclays Global Investors to Blackrock, and Cominvest (owned by Commerzbank) to Allianz.

We expect to find that switches of fund management companies from bank affiliated to unaffiliated due to disinvestments will lead to reduction in the holdings of lending client stocks and improvement in performance. For comparison, we also analyze acquisitions of fund management companies by commercial banking groups, where we expect to find the opposite effects. The sample includes 10 disinvestments of fund management companies (9 unique ultimate owners and 16 domestic equity funds) and 4 acquisitions (4 ultimate owners and 20 domestic equity funds) by commercial banking groups when the other party is not a commercial banking group. This is an unusually high level of M&A transactions when compared to other years in our sample.

Figure 4 shows the portfolio holdings of client stocks in the four quarters before and after the disinvestment of fund management companies. The top panel shows the evolution of the *%TNA Invested in Client Stocks* and the bottom panel shows the evolution of the *%TNA Invested in Top 10 Client Stocks*. The switch of a company from affiliated to unaffiliated is accompanied by significant reductions in the holdings of client stocks. The switch of a fund from unaffiliated to affiliated, however, is accompanied by significant increases in the holdings of client stocks.[21]

We estimate regressions to examine whether portfolio holdings of client stocks and performance change after a fund management company switches from affiliated to unaffiliated or vice-versa. The dependent variable is the portfolio holding (or performance) four quarters before

[21] In the case of a switch from affiliated to unaffiliated, we take the real (fictitious) list of client stocks associated with a parent bank when the fund management company is still affiliated (versus afterward when it is not). In the case of a switch from unaffiliated to affiliated, we do the opposite and take the fictitious (real) client stocks before (and after) it is affiliated with a parent bank.

and four quarters after each event. The explanatory variable is a dummy variable (*After Dummy*) that takes a value of one in the four quarters after the event.

Columns (1)-(4) of Table 11 report estimates for the sample of disinvestments (i.e., management companies that switch from bank-affiliated to unaffiliated). Columns (1) and (2) of Table 11 show that fund managers reduce their holdings of stocks of clients of the parent bank after a switch from affiliated to unaffiliated. On average, the holdings of lending client stocks (*%TNA Invested in Client Stocks*) decline by 5.28 percentage points of TNA (with a t-statistic of -2.45), and the holdings of top ten lending clients (*%TNA Invested in Top 10 Client Stocks*) decline by 1.13 percentage points (with a t-statistic of -1.76). Column (3) of Table 11 shows evidence that benchmark-adjusted returns increase after a switch from affiliated to unaffiliated, but the evidence is weaker for the four-factor alphas in column (4).

Columns (5)-(8) of Table 11 report estimates for the sample of acquisitions (i.e., switches from unaffiliated to bank-affiliated). Columns (5) and (6) show that portfolio managers increase exposure to stocks of the lending clients of the new fund's parent bank following the acquisition. The allocation to top ten client stocks, on average, increases by 2.08 percentage points of TNA (with a t-statistic of 3.52). Columns (7) and (8) show a negative effect on fund performance of a switch from unaffiliated to affiliated, but the effect is imprecisely estimated.

Overall, the results of disinvestments of fund management companies suggest that affiliated fund portfolio managers act as team players and place larger bets in lending client stocks. We also find some evidence that fund performance improves following a disinvestment of a management company by a commercial banking group.

5.2 SEC 2004 Regulatory Reform

The second identification strategy explores the fund regulatory overhaul mandated by the SEC in

the aftermath of the 2003 late trading and market timing scandals.[22] We hypothesize that SEC fund governance reforms may have reduced conflicts of interest in U.S. funds vis-à-vis non-U.S. funds.

While U.S. open-end mutual funds share many similarities with equivalent financial products offered in other parts of the world, namely, with UCITS in Europe, U.S. mutual fund governance differs. U.S. funds have a board of directors, while funds in Europe are overseen by senior managers with no independence requirement. Prior to repeal of the Glass-Steagall Act in 1999, independent board chairs were required for bank-affiliated funds, but this mandate disappeared with enactment of the Gramm-Leach-Bliley Act (Investment Company Institute (2009)). In 2004 the SEC enacted more stringent requirements for board of directors of mutual funds imposing that boards are composed of more than 75% independent directors and have an independent chairman (Securities and Exchange Commission (2006)). The intent was to reduce potential conflicts of interest with affiliated parties and to protect fund investors.[23] Mutual fund companies consented to the reforms, as the compliance rate with the percentage of independent directors rule increased from 59% in 2002 to 88% in 2006 and up to 91% by 2010 (Investment Company Institute (2013)).[24]

We test whether the exogenous SEC reforms to U.S. funds' governance improved their performance over the performance of non-U.S. funds using a difference-in-differences regression. The 2001-2007 sample period includes the three-year period before and the three-

[22] Zitzewitz (2006) finds significant evidence of widespread late trading by fund families.
[23] These reforms were controversial. The U.S. Chamber of Commerce sued and a Federal appeals court invalidated the requirements in 2006, but mutual fund board structures had already changed considerably. The SEC reviewed a number of academic papers in its economic analysis of board independence (Securities and Exchange Comission (2006)) and the Investment Company Institute (2007) provides a critique. Tufano and Sevick (1997) show the impact of boards on fee-setting while Ding and Wermers (2012) find that independent boards affect pre-expense performance.
[24] There were also other regulatory initiatives in other issues such as commissions bundling (Edelen, Evans, and Kadlec (2012)).

year period after the SEC reforms. *Treated Dummy* is a dummy variable that takes a value of one if a fund is domiciled in the United States, and zero otherwise. *After Dummy* is a dummy variable that takes a value of one in 2005 and thereafter. The explanatory variable of interest is the interaction *Treated Dummy* × *After Dummy,* which compares changes in performance between U.S. funds and non-U.S. funds around the reform date. The regression also includes fund-level characteristics, year and country of domicile fixed effects; the coefficients on *Treated Dummy* and *After Dummy* are not separately identified.

Table 12 presents the results. Column (1) shows that the interaction term coefficient is positive and significant at the 1% level, which indicates that the performance of U.S. funds relative to non-U.S. funds improves after the reforms. Columns (2) and (3) present estimates separately for the samples of affiliated and unaffiliated funds. The differential effect is more pronounced in the sample of affiliated funds than in the sample of unaffiliated funds. Column (4) shows that the difference between these two groups of 0.338 percentage points (as indicated by the triple interaction *Bank-Affiliated Dummy* × *Treated Dummy* × *After Dummy* coefficient) funds is statistically significant at the 10% level. In short, we find that governance reforms had a positive impact on the performance of U.S. funds versus non-U.S. funds, especially among bank-affiliated funds where there is a greater potential for conflicts of interest.

One concern about inferences from this treatment-effects framework is whether the treatment and control groups follow parallel trends prior to the treatment. Figure 5 shows no differential pre-trends in performance between U.S. and non-U.S. funds.

5.3 Robustness

Table 13 presents some robustness checks of our primary finding that bank-affiliated funds underperform unaffiliated funds in Table 3. First, column (1) shows that the results are robust

when we use benchmark-adjusted returns in alternative to four-factor alphas. In untabulated tests, we also find similar results when we use market model alphas.

Second, we use alternative estimation methods such as Fama and MacBeth (1973) and weighted least squares (WLS) using fund's TNA as weights. Columns (2) and (3) of Table 13 show that these alternative estimation methods provide estimates of the *Bank-Affiliated Dummy* coefficient that are comparable to the baseline results in Table 3.

Third, we check for the sensitivity of the estimates to the inclusion of small funds and earlier sample years with lower coverage of the population of mutual funds. Columns (4) and (5) indicate that results are robust when we exclude funds with assets under management below $10 million or exclude the first year of the sample (2000).

Finally, we check for the robustness of the findings when we control for the fund's *Active Share* measure (Cremers and Petajisto (2009), Cremers, Ferreira, Matos, and Starks (2015)). Active share is an additional proxy for managerial skill, we include it to alleviate concerns that bank-affiliated funds hire less skilled fund managers. Column (6) shows a similar estimate of the *Bank-Affiliated Dummy* coefficient to that of Table 3, which indicates that our results are not driven by systematic differences in fund manager skills between bank-affiliated and unaffiliated funds.

6. Conclusion

We show that mutual fund performance is negatively affected when a management company is owned by a commercial banking group. We find that bank-affiliated funds underperform unaffiliated funds by about 70 basis points per year. The underperformance is more pronounced, the larger the size of the lending division relative to the asset management division, and the higher the funds' direct exposure to the stock of the bank's lending clients. We interpret this to

indicate that the bank-affiliated fund underperformance seems to be driven by a conflict of interest between the bank's lending business and the asset management division. Our findings suggest that affiliated funds systematically overweight stocks of borrowing firms that help their parent bank build long-term relationships with borrowers and future lending business. We also find that affiliated funds are used to temporarily support the lending clients' stock price, particularly during market downturns.

Alternative explanations such as differences in investor clientele, cross-selling of financial products, and fund manager skill do not seem to explain our findings. We use fund fixed effects to address the concern that the decision to operate a fund management company as affiliated might be related to some unobserved fund characteristics that explain performance. We use quasi-natural experiments involving disinvestments of asset management division and U.S. regulatory reforms to address the concern that past performance might affect the organizational form of a management company. To validate our interpretation further, we also perform falsification tests using passive and international funds in which conflicts of interests are not expected to play an important role.

Overall, our results suggest that the underperformance of bank affiliated funds results from a double agency problem in that portfolio managers put aside the interests of one principal (fund investors) in order to benefit another principal (the parent bank). Our findings have important implications, as about a third of mutual funds worldwide do not operate as stand-alone entities, but rather as divisions of commercial banking groups.

Future research should examine other spillover effects on asset managers run by financial groups that go beyond just commercial bank lending studies in this paper, which can come from other banking operations such as underwriting, advising, and brokerage.

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Table 1
Number of Funds and Total Net Assets by Country

This table presents number of funds, total net assets (TNA), and number of ultimate owners (parents) by domicile country as of December 2010. The table also presents the percentage of bank-affiliated funds. The sample consists of open-end actively managed equity mutual funds in the 2000-2010 period.

Country	Domestic Equity Funds			Bank-Affiliated Funds		
	Number of Funds	TNA ($ billion)	Number of Parents	Number of Funds (%)	TNA (%)	Number of Parents (%)
Australia	98	32.6	28	27.6	16.5	14.3
Austria	13	1.4	11	61.5	81.0	54.5
Belgium	23	1.7	8	73.9	78.6	50.0
Brazil	48	42.0	17	79.2	78.4	58.8
Canada	366	194.6	66	28.4	44.5	21.2
China	69	76.0	35	11.6	8.0	8.6
Denmark	22	3.1	15	54.5	70.0	46.7
Finland	28	5.5	14	71.4	89.8	50.0
France	180	42.2	48	48.9	57.8	27.1
Germany	47	34.8	20	51.1	71.7	45.0
India	242	37.4	31	18.6	17.7	25.8
Israel	37	0.8	15	2.7	1.8	6.7
Italy	30	4.5	15	60.0	55.0	60.0
Japan	515	36.6	43	45.6	36.8	30.2
Malaysia	91	6.4	20	62.6	92.3	45.0
Netherlands	12	4.3	7	66.7	69.9	57.1
Norway	58	15.7	15	58.6	60.2	46.7
Poland	29	5.8	15	58.6	71.0	53.3
Portugal	19	0.5	11	84.2	72.4	81.8
Singapore	13	1.6	10	61.5	28.6	50.0
South Africa	109	21.8	27	38.5	42.3	14.8
Spain	63	2.3	31	65.1	72.4	58.1
Sweden	101	63.2	20	71.3	77.1	40.0
Switzerland	77	20.7	31	55.8	52.1	32.3
Taiwan	147	10.2	31	43.5	26.8	35.5
Thailand	118	5.3	16	62.7	86.0	56.3
United Kingdom	406	215.3	90	17.7	18.0	14.4
United States	2,020	2,683.2	365	20.3	10.9	11.0
Total	4,981	3,569.7	831	32.2	18.1	18.2
Total (ex-U.S.)	2,961	886.5	513	40.3	39.8	25.7
	Domestic and International Equity Funds			Bank-Affiliated Funds		
Total	13,801	6,868.2	1,151	41.1	22.3	16.7
Total (ex-U.S.)	10,955	2,923.2	879	46.6	39.3	20.3

Table 2
Summary Statistics

Panels A and C present mean, median, standard deviation, 1st percentile, 99th percentile and number of observations for each variable. Panel B presents mean and number of observations for the samples of unaffiliated funds and bank-affiliated funds, and the associated mean difference p-value. The sample consists of actively managed domestic equity mutual funds in the 2000-2010 period.

Panel A: Fund Characteristics

	Mean	Median	Standard Deviation	1st Percentile	99th Percentile	Number of Observations
Bank-Affiliated Dummy	0.34	0.00	0.47	0.00	1.00	127,880
Loans/TNA	36.22	0.00	428.03	0.00	548.92	126,782
Syndicated Loans/TNA	5.82	0.00	220.57	0.00	54.59	127,880
Lending / Asset Mgmt. Revenues	8.23	0.00	113.03	0.00	106.2	127,880
%TNA Invested in Client Stocks	5.10	0.00	12.92	0.00	61.23	127,880
Bias in Client Stocks	2.21	0.00	6.82	-1.01	37.90	127,238
%TNA Invested in Top 10 Client Stocks	0.56	0.00	2.49	0.00	12.83	127,880
Bias in Top 10 Client Stocks	0.15	0.00	0.97	-0.64	4.11	127,238
Four-Factor Alpha (%)	0.25	-0.18	5.88	-15.34	19.05	127,880
Gross Four-Factor Alpha (%)	0.51	0.09	5.43	-13.73	18.45	116,554
Buy and Hold Benchmark Adj. Return (%)	0.45	0.28	4.12	-12.36	14.78	123,174
Benchmark Adjusted Return (%)	0.06	-0.09	4.18	-12.28	13.61	125,988
TNA ($ million)	909	158	3,980	1	12,522	127,880
Family TNA ($ million)	35,581	5,501	104,401	15	58,8055	127,880
Age (years)	12.46	9.25	11.16	2.33	59.25	127,880
Total Expense Ratio (%)	1.44	1.38	0.57	0.31	3.50	127,880
Total Load (%)	2.42	2.00	2.40	0.00	10.84	127,880
Flow (%)	0.61	-1.45	15.45	-33.70	69.92	127,880
Number of Countries of Sale	1.16	1.00	0.84	1.00	4.00	127,880
Team Managed Dummy	0.61	1.00	0.49	0.00	1.00	127,880

Panel B: Fund Characteristics of Unaffiliated and Bank-Affiliated Funds

	Unaffiliated Funds		Bank-Affiliated Funds		Difference
	Mean	Number of Observations	Mean	Number of Observations	p-value
Four-Factor Alpha (%)	0.26	84,227	0.22	43,653	0.26
Gross Four-Factor Alpha (%)	0.53	78,536	0.48	38,018	0.19
Buy and Hold Benchmark Adj. Return (%)	0.49	81,481	0.38	41,693	0.00
Benchmark Adjusted Return (%)	0.11	83,189	-0.04	42,799	0.00
TNA ($ million)	1,122	84,227	499	43,653	0.00
Family TNA ($ million)	47,024	84,227	13,501	43,653	0.00
Age (years)	12.54	84,227	12.30	43,653	0.00
Total Expense Ratio (%)	1.44	84,227	1.45	43,653	0.04
Total Load (%)	2.52	84,227	2.24	43,653	0.00
Flow (%)	1.02	84,227	-0.17	43,653	0.00
Number of Countries of Sale	1.16	84,227	1.16	43,653	0.31
Team Managed Dummy	0.59	84,227	0.65	43,653	0.00

Table 2: continued

Panel C: Conflicts of Interest Variables – Sample of Bank-Affiliated Funds

	Mean	Median	Standard Deviation	1st Percentile	99th Percentile	Number of Observations
Loans/TNA	107.90	22.75	733.56	0.17	1,148.47	42,555
Syndicated Loans/TNA	17.05	4.20	377.26	0.00	89.82	43,653
Lending/Asset Mgmt. Revenues	24.12	8.25	192.46	0.00	169.09	43,653
%TNA Invested in Client Stocks	14.94	6.70	18.49	0.00	69.83	43,653
Bias in Client Stocks	6.46	2.38	10.44	-3.52	49.15	43,400
%TNA Invested in Top 10 Client Stocks	1.65	0.00	4.05	0.00	19.24	43,653
Bias in Top 10 Client Stocks	0.44	0.00	1.62	-2.07	6.52	43,400

Table 3
Mutual Fund Performance and Bank-Affiliated Funds

This table presents ordinary least squares (OLS) and fund fixed effects regressions of fund risk-adjusted performance. The dependent variable is the alpha from the Carhart four-factor model in each quarter. *Bank Affiliated* is a dummy that takes a value of one if the ultimate owner of the fund's management company is a commercial banking group, and zero otherwise. The regressions also include domicile country and quarter fixed effects. All control variables are lagged by one period. Variable definitions are provided in Table A.1 in the Appendix. The sample consists of actively managed domestic equity mutual funds in the 2000-2010 period. Robust *t*-statistics adjusted for clustering at the ultimate owner level are reported in parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	OLS				Fixed Effects			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bank Affiliated	-0.1750***				-0.2830**			
	(-3.98)				(-1.97)			
Loans/TNA (log)		-0.0582***				-0.1050**		
		(-4.90)				(-2.12)		
Syndicated Loans/TNA (log)			-0.0490***				-0.0946	
			(-2.60)				(-1.28)	
Lending/Asset Mgmt. Revenues (log)				-0.0452***				-0.1310**
				(-2.95)				(-2.06)
TNA (log)	-0.0509***	-0.0524***	-0.0496***	-0.0496***	-0.6180***	-0.6180***	-0.6190***	-0.6210***
	(-4.63)	(-4.71)	(-4.44)	(-4.45)	(-15.61)	(-15.50)	(-15.61)	(-15.61)
Family TNA (log)	0.0423***	0.0404***	0.0409***	0.0411***	-0.0974	-0.1110	-0.1060	-0.1130
	(3.83)	(3.55)	(3.48)	(3.52)	(-1.25)	(-1.41)	(-1.36)	(-1.44)
Age (log)	-0.0322	-0.0279	-0.0348	-0.0346	-0.3170*	-0.3380*	-0.3130*	-0.3160*
	(-1.18)	(-1.01)	(-1.27)	(-1.27)	(-1.69)	(-1.78)	(-1.66)	(-1.67)
Total Expense Ratio	-0.0299	-0.0297	-0.0268	-0.0286	-0.0727	-0.0793	-0.0790	-0.0791
	(-0.61)	(-0.60)	(-0.55)	(-0.58)	(-0.47)	(-0.51)	(-0.51)	(-0.51)
Total Load	-0.0233**	-0.0256**	-0.0221*	-0.0221*	-0.0228	-0.0255	-0.0202	-0.0210
	(-2.06)	(-2.25)	(-1.95)	(-1.95)	(-0.53)	(-0.58)	(-0.46)	(-0.48)
Flow	0.0073***	0.0074***	0.0074***	0.0074***	0.0054***	0.0054***	0.0054***	0.0054***
	(5.35)	(5.38)	(5.41)	(5.41)	(3.65)	(3.61)	(3.65)	(3.67)
Number Countries of Sale	-0.0054	-0.0068	-0.0055	-0.0055				
	(-0.28)	(-0.37)	(-0.29)	(-0.29)				
Team Managed	-0.1020**	-0.1070***	-0.1070**	-0.1060**				
	(-2.53)	(-2.61)	(-2.58)	(-2.56)				
Past Performance	0.0260***	0.0260***	0.0261***	0.0261***	-0.0174**	-0.0171**	-0.0173**	-0.0173**
	(3.79)	(3.77)	(3.80)	(3.80)	(-2.43)	(-2.39)	(-2.43)	(-2.43)
Number of Observations	127,880	126,782	127,880	127,880	127,880	126,782	127,880	127,880
R-squared	0.145	0.146	0.145	0.145	0.192	0.192	0.192	0.192

Table 4
Probability of Getting Future Lending Business and Mutual Fund Ownership

This table presents results for a logit model of whether the existence of a bank-firm(*i, j*) link through equity fund holdings prior to the loan affects the probability that the firm *j* chooses bank *i* as lead arranger in the syndicated loan market. For each facility, we create a choice set of 20 potential lead arrangers (top 20 lenders ranked by U.S. dollar volume of loans in each country). The dependent variable is a dummy variable that takes the value of one if bank *i* acted as a lead arranger and zero otherwise. *Fund Ownership Dummy* is a dummy that takes the value of one if the fund families affiliated with bank *i* own equity of the borrowing firm at the end of the previous year. *Fund Ownership >1% Dummy* is a dummy that takes the value of one if the fund families affiliated with bank *i* own at least 1% of the borrower's shares at the end of the previous year. *Lender Market Share* is the fraction of bank *i* on the U.S. dollar volume of loans in each country in the previous year. *Lending Relationship* is a dummy that takes the value of one if firm *j* chose bank *i* as lead arranger in a loan in the three years preceding the quarter of the loan. Borrower-specific controls include stock market capitalization (log), book-to-market ratio, leverage, tangibility, stock volatility and stock return (coefficients not shown). The sample consists of syndicated loans by publicly listed borrowers in the 2000-2010 period. Robust *t*-statistics adjusted for clustering at the firm- and bank-level are reported in parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)
Fund Ownership Dummy	0.268***		0.192***	
	(5.70)		(3.00)	
Fund Ownership >1% Dummy		0.347***		0.344***
		(3.53)		(3.89)
Lender Market Share	13.272***	13.525***	13.593***	13.825***
	(22.72)	(23.56)	(16.70)	(15.99)
Lending Relationship	1.909***	1.944***	1.745***	1.747***
	(27.35)	(29.08)	(24.63)	(24.79)
Lender Assets (log)			0.120	0.109
			(1.28)	(1.12)
Lender ROA			0.096	0.105
			(1.15)	(1.32)
Year Fixed Effects	Yes	Yes	Yes	Yes
Loan Purpose Fixed Effects	Yes	Yes	Yes	Yes
Borrower Industry Fixed Effects	Yes	Yes	Yes	Yes
Borrower Country Fixed Effects	Yes	Yes	Yes	Yes
Borrower Controls	No	No	Yes	Yes
Lender Fixed Effects	No	No	Yes	Yes
Number of Observations	499,615	499,615	403,133	403,133
Pseudo R-squared	0.21	0.21	0.23	0.23
Probability of being chosen as the lead lender using the column (1) specification			Existing lending relationship	
		Average	No	Yes
Fund Ownership Dummy = 0		0.126	0.094	0.413
Fund Ownership Dummy = 1		0.158	0.120	0.479
Change in Probability		0.032	0.026	0.066
Probability of being chosen as the lead lender using the column (2) specification			Existing lending relationship	
		Average	No	Yes
Fund Ownership >1% Dummy = 0		0.135	0.101	0.441
Fund Ownership >1% Dummy = 1		0.181	0.138	0.527
Change in Probability		0.046	0.037	0.086

Table 5
Mutual Fund Performance and Bank-Affiliated Funds: Gross Returns and Buy and Hold Returns

This table presents ordinary least squares (OLS) regressions of fund risk-adjusted performance. The dependent variable are the alpha from the Carhart four-factor model using gross fund returns, and the buy and hold benchmark-adjusted return using fund's stock holdings in each quarter. *Bank Affiliated* is a dummy that takes a value of one if the ultimate owner of the fund's management company is a commercial banking group, and zero otherwise. The regressions also include domicile country and quarter fixed effects. All control variables are lagged by one period. Variable definitions are provided in Table A.1 in the Appendix. The sample consists of actively managed domestic equity mutual funds in the 2000-2010 period. Robust *t*-statistics adjusted for clustering at the ultimate owner level are reported in parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Gross Returns				Buy and Hold Benchmark-Adjusted Returns			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bank Affiliated	-0.1730***				-0.1560***			
	(-4.02)				(-3.36)			
Loans/TNA (log)		-0.0589***				-0.0337***		
		(-5.12)				(-2.96)		
Syndicated Loans/TNA (log)			-0.0586***				-0.0464***	
			(-3.28)				(-2.70)	
Lending/Asset Mgmt. Revenues (log)				-0.0428***				-0.0405***
				(-2.85)				(-2.89)
TNA (log)	-0.0629***	-0.0643***	-0.0615***	-0.0614***	-0.0641***	-0.0644***	-0.0630***	-0.0630***
	(-5.97)	(-6.04)	(-5.74)	(-5.74)	(-3.24)	(-3.18)	(-3.13)	(-3.14)
Family TNA (log)	0.0409***	0.0390***	0.0398***	0.0398***	0.0171	0.0152	0.0160	0.0161
	(3.77)	(3.50)	(3.46)	(3.45)	(0.84)	(0.71)	(0.75)	(0.76)
Age (log)	-0.0230	-0.0187	-0.0252	-0.0253	0.0721**	0.0722**	0.0695**	0.0696**
	(-0.91)	(-0.72)	(-0.99)	(-0.99)	(2.40)	(2.37)	(2.29)	(2.30)
Total Expense Ratio	0.158***	0.158***	0.162***	0.161***	-0.00413	0.00308	-0.00102	-0.00259
	(3.09)	(3.05)	(3.16)	(3.13)	(-0.09)	(0.07)	(-0.02)	(-0.06)
Total Load	-0.0203*	-0.0225*	-0.0194*	-0.0191	-0.0263**	-0.0268**	-0.0253**	-0.0252**
	(-1.74)	(-1.92)	(-1.65)	(-1.62)	(-2.29)	(-2.32)	(-2.19)	(-2.19)
Flow	0.0065***	0.0065***	0.0065***	0.0066***	0.0024**	0.0025**	0.0025**	0.0025**
	(5.01)	(5.04)	(5.07)	(5.08)	(2.13)	(2.18)	(2.18)	(2.17)
Number of Countries of Sale	-0.00900	-0.0103	-0.00974	-0.00917	0.0320*	0.0320*	0.0317*	0.0319*
	(-0.50)	(-0.59)	(-0.56)	(-0.53)	(1.73)	(1.78)	(1.76)	(1.77)
Team Managed	-0.1130***	-0.1170***	-0.1160***	-0.1160***	-0.0239	-0.0263	-0.0279	-0.0272
	(-2.76)	(-2.80)	(-2.73)	(-2.74)	(-0.54)	(-0.59)	(-0.62)	(-0.61)
Past Performance	0.0317***	0.0317***	0.0318***	0.0318***	0.0611***	0.0613***	0.0612***	0.0612***
	(4.96)	(4.93)	(4.96)	(4.97)	(12.56)	(12.57)	(12.60)	(12.60)
Number of Observations	116,266	115,172	116,266	116,266	120,198	119,156	120,198	120,198
R-squared	0.174	0.175	0.174	0.174	0.051	0.051	0.051	0.051

Table 6
Flow-Performance Relationship and Bank Affiliated Funds

This table presents ordinary least squares (OLS) regressions of fund flows (net growth in total net assets) on lagged performance. Fractional performance ranks ranging from zero to one are assigned to funds according to their average Carhart four-factor model in the past four quarters in a given quarter and country. Column (1) uses a linear specification and column (2) uses a piecewise linear specification using three performance rank segments: $Low_{i,t-1} = \min(0.2, Rank_{i,t-1})$, $Mid_{i,t-1} = \min(0.6\ Rank_{i,t-1} - Low_{i,t-1})$, and $High_{i,t-1} = Rank_{i,t-1} - (Low_{i,t-1} + Mid_{i,t-1})$. *Bank Affiliated* is a dummy takes a value of one if the ultimate owner of the fund's management company is a commercial banking group, and zero otherwise. The regressions include the same control variables (coefficients not shown) as in Table 3. The regressions also include domicile country and quarter fixed effects. Variable definitions are provided in Table A.1 in the Appendix. The sample consists of actively managed domestic equity mutual funds in the 2000-2010 period. Robust t-statistics adjusted for clustering at the ultimate owner level are reported in parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Linear	Piecewise
	(1)	(2)
Bank Affiliated	-0.2670	-0.8240
	(-0.84)	(-1.42)
Rank	6.0070***	
	(21.26)	
Bank Affiliated × Rank	-0.9040	
	(-1.60)	
Low		6.8270***
		(3.55)
Bank Affiliated × Low		2.3710
		(0.80)
Mid		4.7290***
		(12.76)
Bank Affiliated × Mid		-0.7880
		(-1.27)
High		14.470***
		(6.96)
Bank Affiliated × High		-3.9660
		(-1.14)
Number of Observations	119,424	119,424
R-squared	0.095	0.096

Table 7
Falsification Tests: Passive Funds, International Funds, U.S. and Non-U.S. Funds

This table presents ordinary least squares (OLS) of fund risk-adjusted performance. The dependent variable is the alpha from the Carhart four-factor model in each quarter. *Bank Affiliated* is a dummy that takes a value of one if the ultimate owner of the fund's management company is a commercial banking group, and zero otherwise. The regressions include the same control variables (coefficients not shown) as in Table 3. The regressions also include domicile country and quarter fixed effects. Variable definitions are provided in Table A.1 in the Appendix. The sample consists of passive and active international equity mutual funds in Panel A and U.S.-domiciled and non-U.S.-domiciled active domestic equity mutual funds in Panel B in the 2000-2010 period. Robust *t*-statistics adjusted for clustering at the ultimate owner level are reported in parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Passive and International Funds

	Passive Funds				International Funds			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bank Affiliated	0.0651				-0.0646			
	(1.13)				(-1.30)			
Loans/TNA (log)		-0.0020				-0.0248*		
		(-0.18)				(-1.78)		
Syndicated Loans/TNA (log)			-0.0034				-0.0374*	
			(-0.24)				(-1.83)	
Lending/Asset Mgmt. Revenues (log)				-0.0043				-0.0381**
				(-0.39)				(-2.04)
Number of Observations	23,083	23,033	23,083	23,083	114,637	113,991	114,637	114,637
R-squared	0.117	0.117	0.117	0.117	0.062	0.063	0.062	0.062

Panel B: U.S and Non-U.S. Funds

	U.S. Funds				Non-U.S. Funds			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bank Affiliated	-0.1190**				-0.2490***			
	(-2.08)				(-3.52)			
Loans/TNA (log)		-0.0410**				-0.0664***		
		(-2.47)				(-4.21)		
Syndicated Loans/TNA (log)			-0.0441				-0.0478*	
			(-1.56)				(-1.85)	
Lending/Asset Mgmt. Revenues (log)				-0.0276				-0.0646***
				(-1.23)				(-2.75)
Number of Observations	77,016	76,061	77,016	77,016	50,864	50,721	50,864	50,864
R-squared	0.246	0.247	0.246	0.246	0.088	0.088	0.087	0.087

Table 8
Mutual Fund Performance and Portfolio Allocation to Client Stocks

This table presents ordinary least squares (OLS) of fund risk-adjusted performance. The dependent variable are the alpha from the Carhart four-factor model using net returns (Panel A) and gross returns (Panel B), and the buy and hold benchmark-adjusted return using fund's stock holdings in each quarter (Panel C). *%TNA Invested in Client Stocks* is percentage invested in stocks of firms that borrow from the fund's affiliated bank and are held by the fund. *Bias in Client Stocks* is the portfolio bias in stocks of firms that borrow from the fund's affiliated bank versus the average weight of active peer funds. *%TNA Invested in Top 10 Client Stocks* and *Bias in Top 10 Client Stocks* are similarly defined for the set of top ten borrowers of the fund's affiliated bank. All these variables are zero if the fund is unaffiliated. The regressions include the same control variables (coefficients not shown) as in Table 3. The regressions also include domicile country and quarter fixed effects. Variable definitions are provided in Table A.1 in the Appendix. The sample consists of actively managed domestic equity mutual funds in the 2000-2010 period. Robust *t*-statistics adjusted for clustering at the ultimate owner level are reported in parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: 4-Factor Alphas

	(1)	(2)	(3)	(4)
%TNA Invested in Client Stocks	-0.0042***			
	(-3.58)			
Bias in Client Stocks		-0.0042*		
		(-1.76)		
%TNA Invested in Top 10 Client Stocks			-0.0265**	
			(-2.13)	
Bias in Top 10 Client Stocks				-0.0639**
				(-2.17)
Number of Observations	127,880	127,238	127,880	127,238
R-squared	0.145	0.145	0.145	0.145

Panel B: 4-Factor Alpha - Gross Returns

	(1)	(2)	(3)	(4)
%TNA Invested in Client Stocks	-0.0054***			
	(-3.74)			
Bias in Client Stocks		-0.0042*		
		(-1.74)		
%TNA Invested in Top 10 Client Stocks			-0.0329**	
			(-2.24)	
Bias in Top 10 Client Stocks				-0.0757**
				(-2.20)
Number of Observations	116,266	115,649	116,266	115,649
R-squared	0.174	0.174	0.174	0.174

Panel C: Buy and Hold Benchmark-Adjusted Returns

	(1)	(2)	(3)	(4)
%TNA Invested in Client Stocks	-0.0028**			
	(-2.52)			
Bias in Client Stocks		-0.0040**		
		(-2.02)		
%TNA Invested in Top 10 Client Stocks			-0.0102*	
			(-1.82)	
Bias in Top 10 Client Stocks				-0.0177
				(-1.02)
Number of Observations	120,198	120,198	120,198	120,198
R-squared	0.051	0.051	0.051	0.051

Table 9
Mutual Fund Performance and Portfolio Allocation to Client Stocks Not Held

This table presents ordinary least squares (OLS) of fund risk-adjusted performance. The dependent variable is the alpha from the Carhart four-factor model in each quarter. *Bias in Client Stocks Not Held* is the portfolio bias in stocks of firms that borrow from the fund's affiliated bank but not held by the bank-affiliated fund. *Bias in Top 10 Client Stocks Not Held* is similarly defined for the set of top ten borrowers. All these variables are zero if the fund is unaffiliated. The regressions also include domicile country and quarter fixed effects. All control variables are lagged by one period. Variable definitions are provided in Table A.1 in the Appendix. The sample consists of actively managed domestic equity mutual funds in the 2000-2010 period. Robust *t*-statistics adjusted for clustering at the ultimate owner level are reported in parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)
Bias in Client Stocks Not Held	0.00207	
	(0.83)	
Bias in Top 10 Client Stocks Not Held		0.0979**
		(2.43)
TNA (log)	-0.0544***	-0.0550***
	(-4.90)	(-4.98)
Family TNA (log)	0.0394***	0.0402***
	(3.23)	(3.39)
Age (log)	-0.0265	-0.0261
	(-0.98)	(-0.97)
Total Expense Ratio	-0.00574	-0.00742
	(-0.12)	(-0.16)
Total Load	-0.0227**	-0.0234**
	(-2.03)	(-2.10)
Flow	0.0073***	0.0073***
	(5.38)	(5.37)
Number of Countries of Sale	-0.00287	-0.00236
	(-0.15)	(-0.13)
Team Managed Dummy	-0.0954**	-0.0959**
	(-2.26)	(-2.28)
Past Performance	0.0253***	0.0252***
	(3.65)	(3.63)
Number of Observations	127,238	127,238
R-squared	0.145	0.145

Table 10
Performance of Client Stocks and Non-Client Stocks Portfolios

This table shows risk-adjusted performance and loadings of client and non-client stock portfolios, and the associated difference, using the Carhart four-factor model. Calendar time monthly portfolio returns are constructed using the sample of bank-affiliated funds' portfolio holdings. Every quarter, stocks are assigned to the client or non-client stock portfolio. Client stocks include holdings of firms that borrow from the fund's affiliated bank over the past three years, and non-client stocks include holdings of firms that have not borrowed from the fund's affiliated bank over the past three years. The U.S. dollar-weighted average monthly return of these portfolios are computed for each fund every month and then averaged across all funds (value-weighted by total net assets at the beginning of the quarter). *Bear Market* is a dummy that takes a value of one in the 2000-2002 and 2008-2009 periods, and zero otherwise. *MKT* is the excess return on the fund's stock investment region. *SMB* is the average return on the small-capitalization stock portfolio minus the average return on the large-capitalization stock portfolio on the fund's investment region. *HML* is the difference in return between the portfolio with high book-to-market stocks and the portfolio with low book-to-market stocks on the fund's investment region. *MOM* is the difference in return between the portfolio with the past 12-month stock winners and the portfolio with the past 12-month stock losers on the fund's investment region. The sample consists of actively managed domestic equity mutual funds in the 2000-2010 period. *t*-statistics are reported in parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Constant	Bear Market	MKT	SMB	HML	MOM	R-squared
Client Stocks	0.0464	0.3000	1.1700***	0.0082	-0.1690***	-0.0467**	0.969
	(0.34)	(1.44)	(51.55)	(0.16)	(-4.39)	(-2.03)	
Non-Client Stocks	-0.0721	0.6450***	1.1500***	-0.0286	-0.1380***	-0.0003	0.970
	(-0.57)	(3.29)	(54.00)	(-0.58)	(-3.81)	(-0.01)	
Client Stocks – Non-Client Stocks	0.1190	-0.3440**	0.0196	0.0369	-0.0313	-0.0464**	0.143
	(1.09)	(-2.05)	(1.07)	(0.87)	(-1.01)	(-2.50)	

Table 11
Disinvestments and Acquisitions of Fund Management Companies by Commercial Banking Groups

This table presents fund's holdings and risk-adjusted performance (benchmark-adjusted return and four-factor alpha) in the four quarters before and after the disinvestment or acquisition of a fund management company. The sample of events is from the third quarter of 2007 to the second quarter of 2009. *%TNA Invested in Client Stocks* is percentage invested in stocks of firms that borrow from the fund's affiliated bank and are held by the fund. *%TNA Invested in Top 10 Client Stocks* is similarly defined for the set of top ten borrowers of the fund's affiliated bank. The sample of disinvestments includes funds of management companies affiliated to commercial banking groups that are sold to an unaffiliated management companies. The sample of acquisitions includes funds of unaffiliated management companies that are sold to fund management companies affiliated to commercial banking groups. *After* is a dummy variable that takes a value of one after the disinvestment or acquisition, and zero otherwise. The sample consists of actively managed domestic equity mutual funds. Robust *t*-statistics adjusted for clustering at the ultimate owner level are reported in parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Sample of Disinvestments				Sample of Acquisitions			
	%TNA Invested in Client Stocks	%TNA Invested in Top 10 Client Stocks	Benchmark-Adjusted Return	Four-Factor Alpha	%TNA Invested in Client Stocks	%TNA Invested in Top 10 Client Stocks	Benchmark-Adjusted Return	Four-Factor Alpha
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
After	-5.28**	-1.13*	1.12*	-0.68	1.90	2.08***	-0.41	-1.76
	(-2.45)	(-1.76)	(1.77)	(-0.49)	(1.39)	(3.52)	(-0.58)	(-1.63)
Constant	27.86***	4.06**	-0.18**	1.12	18.69***	1.60**	-0.39	1.20
	(4.46)	(2.19)	(-0.24)	(1.20)	(4.13)	(2.30)	(-0.88)	(1.35)
Number of Observations	144	144	144	132	180	180	180	178
R-squared	0.014	0.008	0.013	0.002	0.002	0.063	0.002	0.020

Table 12
Differences-in-Differences Tests Around 2004 SEC Fund Regulatory Reforms

This table presents difference-in-difference regressions of the quarterly risk-adjusted performance around the SEC mutual fund regulatory reform in 2004. The dependent variable is the alpha from the Carhart four-factor model in each quarter. *Treated* is a dummy variable that takes a value of one if a fund is domiciled in the United States, and zero otherwise. *After* is a dummy variable that takes a value of one in 2005 and thereafter, and zero otherwise. The regressions include the same control variables (coefficients not shown) as in Table 3. The regressions also include domicile country and quarter fixed effects. Variable definitions are provided in Table A.1 in the Appendix. The sample consists of actively managed domestic equity mutual funds in the 2001-2007 period. Robust *t*-statistics adjusted for clustering at the ultimate owner level are reported in parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	All Funds	Bank-Affiliated Funds	Unaffiliated Funds	All Funds
	(1)	(2)	(3)	(4)
Treated × After	1.2450***	1.3980***	1.1030***	1.0950***
	(12.14)	(9.13)	(7.83)	(7.89)
Bank Affiliated × Treated × After				0.3380*
				(1.71)
Bank Affiliated × Treated				-0.2770*
				(-1.74)
Bank Affiliated × After				-0.2190
				(-1.28)
Bank Affiliated				0.0235
				(0.17)
Number of Observations	77,083	27,559	49,524	77,083
R-squared	0.046	0.059	0.041	0.046

Table 13
Robustness

This table presents ordinary least squares (OLS) regressions of fund risk-adjusted performance. The dependent variable is the benchmark-adjusted return (the difference between the fund net return and its benchmark return) in column (1) and the alpha from the Carhart four-factor model in columns (2)-(6) in each quarter. Column (2) uses the Fama-MacBeth method. Column (3) use weighted least squares (WLS) regressions using funds' TNA as weights. Column (4) excludes funds with assets under management below $10 million. Column (5) excludes the first year of the sample. Column (6) includes the fund's *Active Share* as a control variable. *Bank Affiliated* is a dummy takes a value of one if the ultimate owner of the fund's management company is a commercial banking group, and zero otherwise. The regressions also include domicile country and quarter fixed effects. All control variables are lagged by one period. Variable definitions are provided in Table A.1 in the Appendix. The sample consists of actively managed domestic equity mutual funds in the 2000-2010 period. Robust *t*-statistics adjusted for clustering at the ultimate owner level are reported in parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	Benchmark-Adjusted Return	Fama-MacBeth	WLS	TNA above $10 million	2001-2010	Active Share
	(1)	(2)	(3)	(4)	(5)	(6)
Bank Affiliated	-0.1880***	-0.1790***	-0.2300***	-0.1650***	-0.1910***	-0.1620***
	(-4.19)	(-3.10)	(-3.97)	(-3.56)	(-4.13)	(-3.69)
TNA (log)	-0.0828***	-0.0441	-0.0321	-0.0504***	-0.0736***	-0.0589***
	(-3.98)	(-1.29)	(-1.42)	(-3.93)	(-5.65)	(-5.17)
Family TNA (log)	0.0390*	0.0357***	0.0349*	0.0465***	0.0425***	0.0488***
	(1.76)	(3.45)	(1.82)	(4.13)	(3.60)	(4.26)
Age (log)	0.0819***	-0.0460	-0.0434	-0.0071	0.0323	-0.0114
	(2.70)	(-0.83)	(-0.64)	(-0.27)	(1.11)	(-0.43)
Total Expense Ratio	-0.1980***	-0.1520	-0.0125	-0.0014	-0.0528	-0.0388
	(-4.08)	(-1.28)	(-0.10)	(-0.03)	(-1.03)	(-0.79)
Total Load	-0.0262**	-0.0176	-0.0201	-0.0299***	-0.0244**	-0.0270**
	(-2.21)	(-1.17)	(-1.07)	(-2.62)	(-2.12)	(-2.41)
Flow	0.0022**	0.0059	0.0219***	0.0080***	0.0036***	0.0059***
	(2.22)	(1.36)	(4.41)	(5.55)	(2.68)	(4.56)
Number of Countries of Sale	0.0412**	-0.0644	-0.0241	-0.0075	-0.0003	-0.0091
	(2.06)	(-1.15)	(-1.45)	(-0.41)	(-0.01)	(-0.49)
Team Managed	-0.0375	-0.1180***	-0.1260**	-0.0991**	-0.0731*	-0.0827**
	(-0.76)	(-2.97)	(-2.34)	(-2.39)	(-1.75)	(-2.00)
Past Performance	0.0806***	0.0395	0.0503***	0.0234***	0.00679	0.0214***
	(16.60)	(1.28)	(4.49)	(3.36)	(0.96)	(2.88)
Active Share						0.6770***
						(5.75)
Number of Observations	125,920	127,880	127,880	118,316	122,972	124,369
R-squared	0.034	0.400	0.275	0.154	0.098	0.145

Figure 1
Market Share of Bank-Affiliated Mutual Funds

This figure shows the number of funds (top panel) and total net assets (bottom panel) of bank-affiliated and unaffiliated mutual funds by year. A fund is classified as bank affiliated if the ultimate owner of the fund's management company is a commercial banking group. The sample consists of actively managed domestic equity mutual funds in the 2000-2010 period.

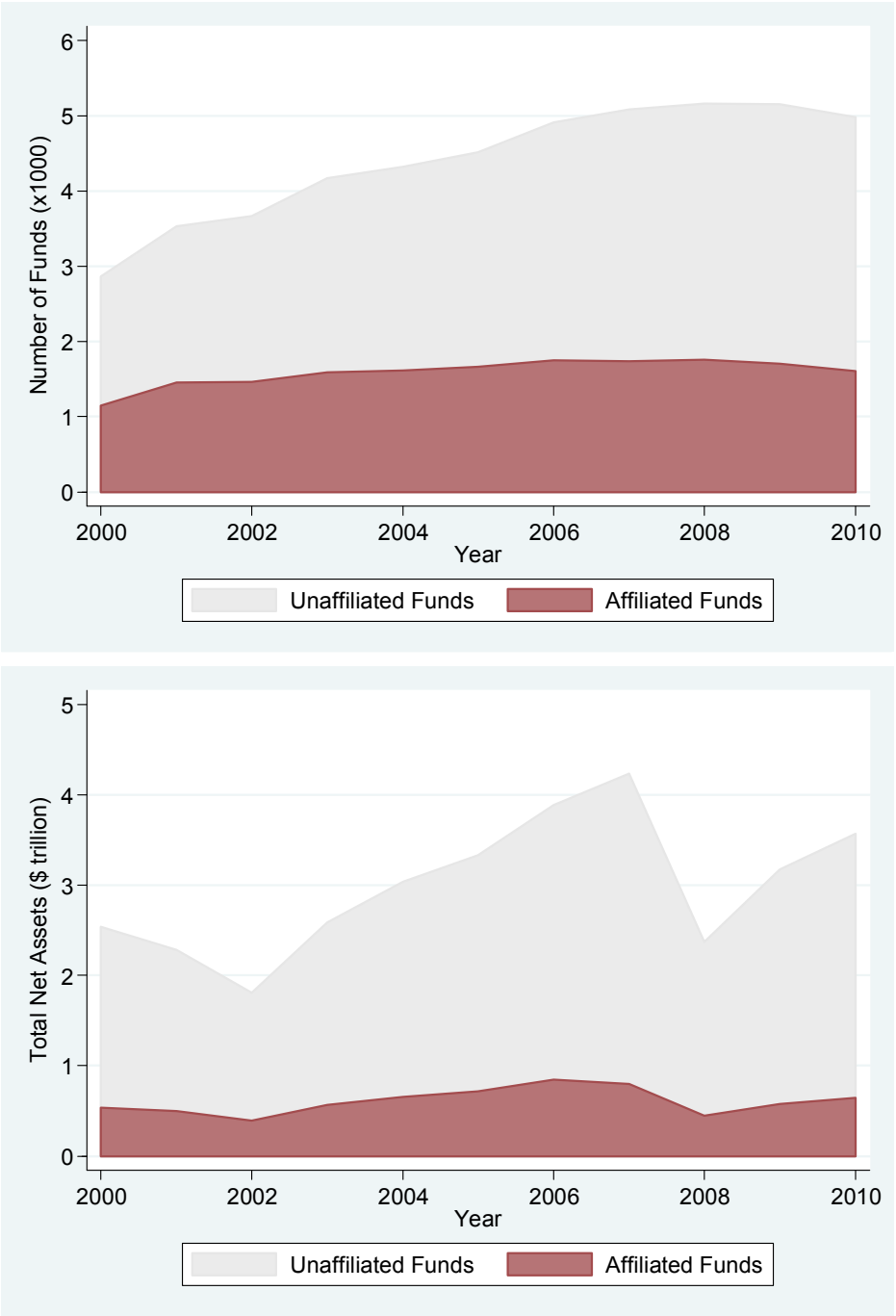


Figure 2
Time Series of the Effect of Bank Affiliation on Mutual Fund Performance

This figure shows point estimates and associated 90% confidence interval (shaded area) of ordinary least squares (OLS) regressions of fund risk-adjusted performance. Regressions are separately estimated for each year. The dependent variable is the alpha from the Carhart four-factor model in each quarter. Coefficients are scaled to an annual basis by multiplying by four. The sample consists of actively managed domestic equity mutual funds in the 2000-2010 period.

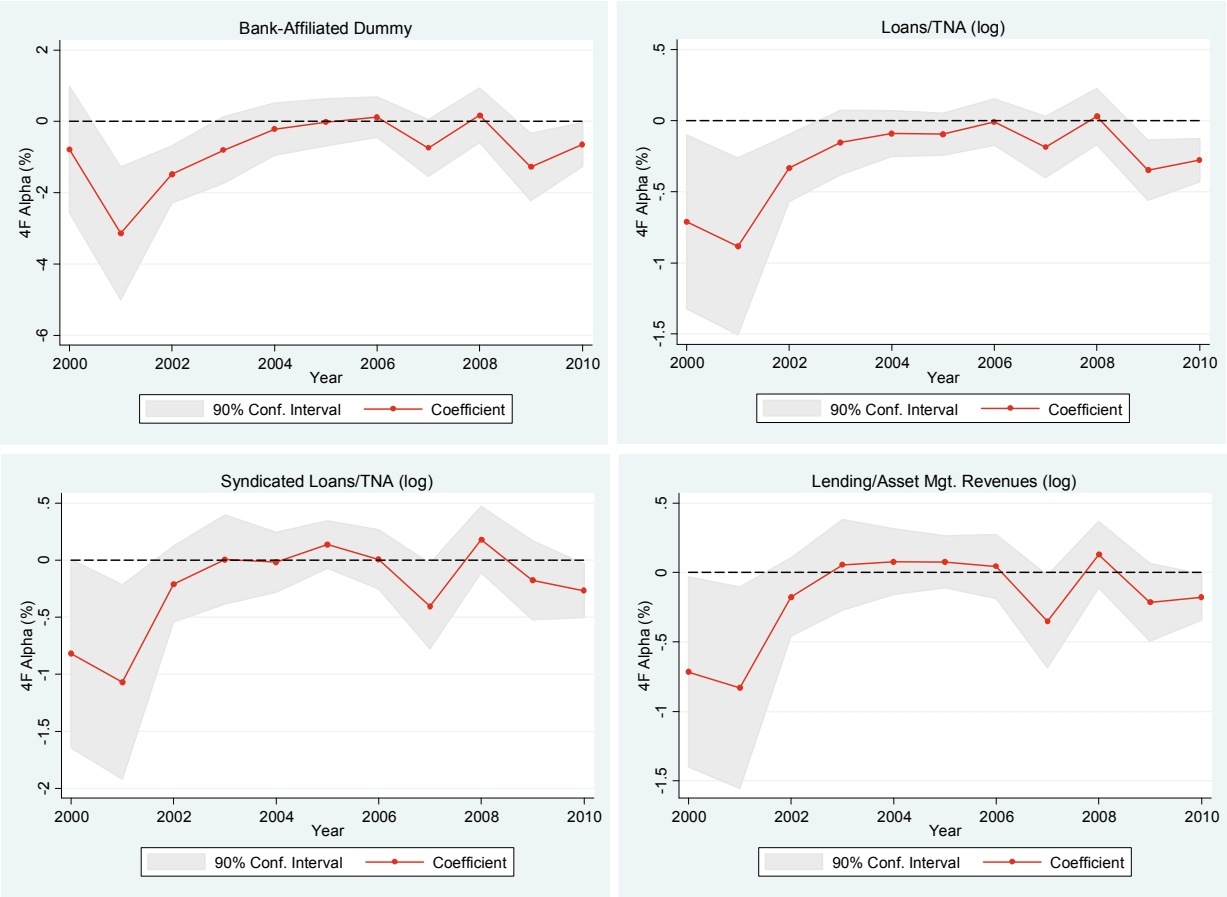
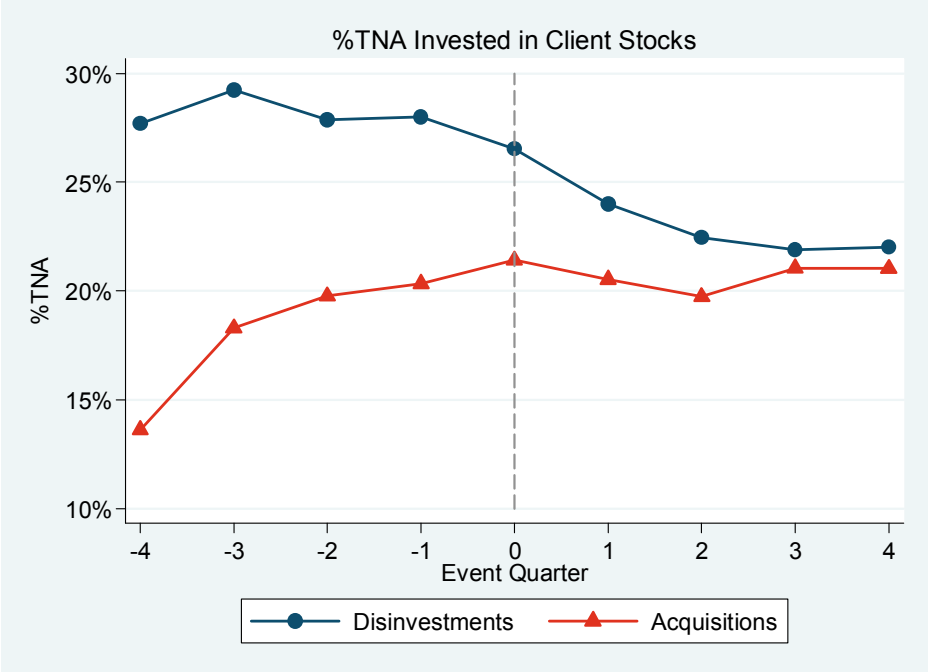


Figure 3
Time Series of the Effect of Client Holdings on Mutual Fund Performance

This figure shows point estimates and associated 90% confidence interval (shaded area) of ordinary least squares (OLS) regressions of fund risk-adjusted performance. Regressions are separately estimated for each year. The dependent variable is the alpha from the Carhart four-factor model in each quarter. Coefficients are scaled to an annual basis by multiplying by four. The sample consists of actively managed domestic equity mutual funds in the 2000-2010 period.

Figure 4
Portfolio Allocation to Client Stocks Around Disinvestments and Acquisitions

This figure shows fund's holdings around disinvestment and acquisitions of fund management companies during the global financial crisis from the third quarter of 2007 to the second quarter of 2009. *%TNA Invested in Client Stocks* is percentage invested in stocks of firms that borrow from the fund's affiliated bank and are held by the fund. *%TNA Invested in Top 10 Client Stocks* is similarly defined for the set of top ten borrowers of the fund's affiliated bank. The sample of disinvestments includes funds of management companies affiliated to commercial banking groups that are sold to an unaffiliated management companies. The sample of acquisitions includes funds of unaffiliated management companies that are sold to fund management companies affiliated to commercial banking groups. The sample consists of actively managed domestic equity mutual funds in the 2000-2010 period.



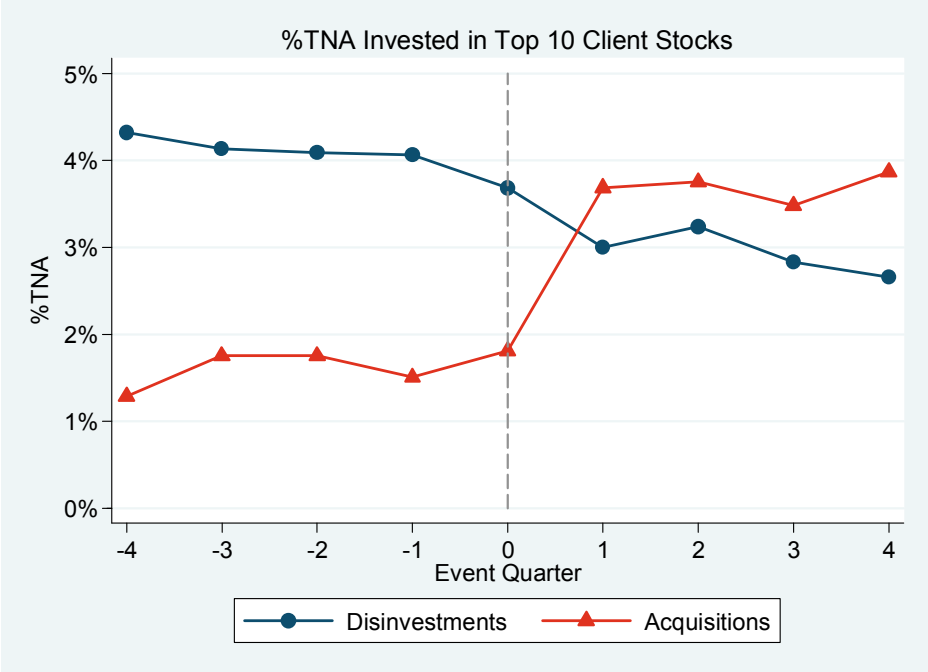
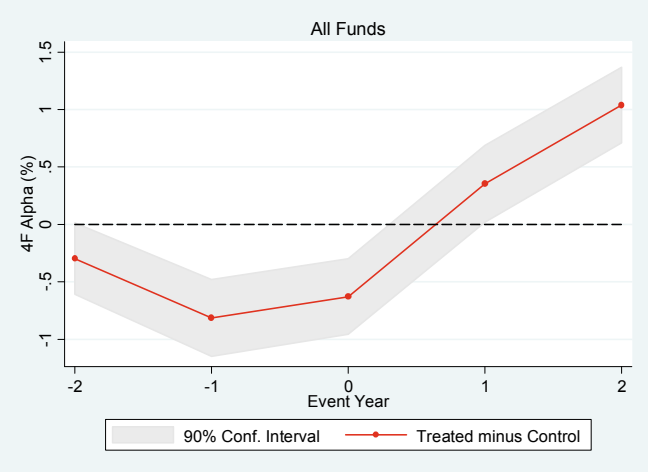
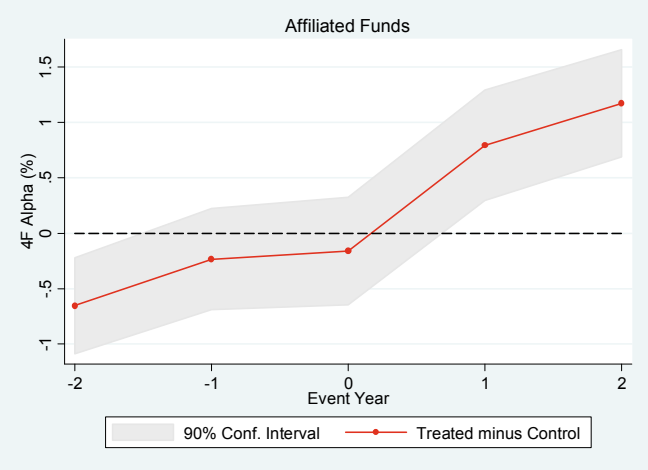


Figure 5
Mutual Fund Performance Around 2004 SEC Fund Regulatory Reforms

This figure shows point estimates and associated 90% confidence interval of differences in risk-adjusted performance (four-factor alpha) around the SEC mutual fund regulatory reform in 2004. Treated group contains funds domiciled in the United States, and control group contains domiciled outside of the United States. The sample consists of actively managed domestic equity mutual funds in the 2001-2007 period.





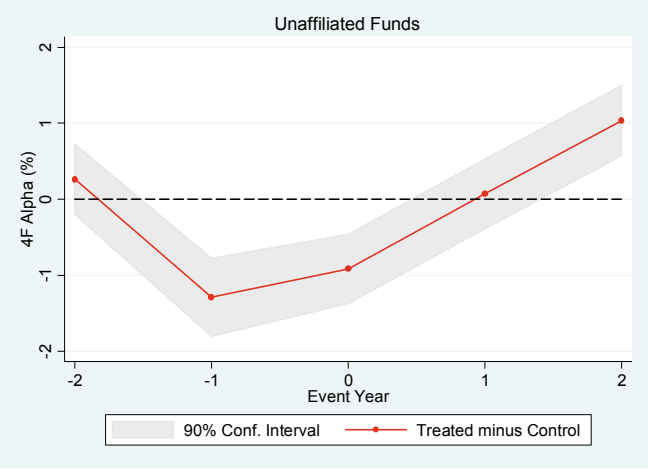


Table A.1
Variable Definitions

Variable	Definition
Bank-Affiliated Dummy	Dummy that takes a value of one if the ultimate owner of the fund's management company is a commercial banking group, and zero otherwise.
Loans/TNA	Loans outstanding of fund's parent bank divided by total net assets (in equity funds) of fund management company.
Syndicated Loans/TNA	Syndicated loans outstanding of fund's parent bank divided by total net assets (in equity funds) of fund management company.
Lending/Asset Mgmt. Revenues	Fund's parent bank syndicated loan revenue, defined as the sum of loans outstanding times all-in drawn spread, divided by revenues of fund management company, defined as the sum of TNA times the total expense ratio (in equity funds).
%TNA Invested in Client Stocks	Sum of portfolio holdings in stocks of firms that are among the fund's parent bank lending clients over the past three years.
Bias in Client Stocks (%TNA)	Sum of portfolio bias in stocks of firms that are among the fund's parent bank lending clients over the past three years.
%TNA Invested in Top 10 Client Stocks	Sum of portfolio holdings in stocks of firms that are among the top ten lending clients of the fund's parent bank over the past three years.
Bias in Top 10 Client Stocks	Sum of portfolio bias in stocks of firms that are among the top ten lending clients of the fund's parent bank over the past three years.
Bias in Client Stocks Not Held	Sum of portfolio holdings in stocks of firms that are among the fund's parent bank lending clients and are not held by the fund.
Bias in Top10 Client Stocks Not Held	Sum of portfolio bias in stocks of firms are among the top ten lending clients of the fund's parent bank over the past three years and are not held by the fund.
Four-Factor Alpha	Four-factor alpha (percentage per quarter) estimated with three years of past monthly fund net returns in U.S. dollars and regional factors (Asia, Europe, North America or Emerging Markets) or world factors in the case of world funds.
Gross Four-Factor Alpha	Four-factor alpha (percentage per quarter) estimated with three years of past monthly fund gross returns in U.S. dollars and regional factors (Asia, Europe, North America, or Emerging Markets) or world factors in the case of world funds.
Buy and Hold Benchmark-Adjusted Return	Difference between the fund buy-and-hold return and its benchmark return (percentage per quarter).
Benchmark-Adjusted Return	Difference between the fund net return and its benchmark return (percentage per quarter).
TNA	Total net assets (in U.S. dollar millions) of fund.
Family TNA ($ million)	Total net assets (in U.S. dollar millions) of funds managed by the fund management company to which the fund belongs.
Age	Number of years since the fund launch date.
Total Expense ratio	Total annual expenses as a fraction of total net assets.
Total Load	Sum of front-end and back-end loads as a fraction of new investments.
Flow	Percentage growth in TNA in a quarter, net of internal growth (assuming reinvestment of dividends and distributions).
Number of Countries of Sale	Number of countries where the fund is sold.
Team Managed	Dummy variable that takes a value of one if the fund is managed by a team, and zero otherwise.
Active Share	Share of portfolio holdings that differs from the benchmark index holdings computed as $\frac{1}{2}\sum_{i=1}^{N}\left\|W_{fund,i}-W_{benchmark,i}\right\|$

Internet Appendix to

"Asset Management within Commercial Bank Groups: International Evidence"

Table IA.1
Top Management Companies by Country

This table presents number of funds and total net assets of the top five management companies by fund domicile in terms of total net assets (TNA) in U.S. dollars as of 2010. *Bank Affiliated* is a dummy takes a value of one if the ultimate owner of the fund's management company is a commercial banking group, and zero otherwise. The sample consists of actively managed domestic and international equity mutual funds in the 2000-2010 period.

Country	Ultimate Owner	Bank Affiliated	TNA ($billion)	Number of Funds
Australia	Platinum Asset Management Ltd.	0	14.70	8
Australia	Perpetual Ltd.	0	5.81	9
Australia	Schroders Plc	0	5.20	10
Australia	AMP Ltd.	0	4.54	7
Australia	Westpac Banking Corp.	1	4.16	24
Austria	Raiffeisen Zentralbank Österreich AG	1	3.21	13
Austria	Erste Group Bank AG	1	3.16	32
Austria	UniCredit SpA (Pioneer)	1	2.00	20
Austria	Investec Plc (Investec Bank Ltd.)	1	0.99	3
Austria	Wellington Management Co. LLP	0	0.51	5
Belgium	KBC Groupe SA	1	17.21	393
Belgium	Petercam SA/NV	0	2.59	14
Belgium	Dexia SA	1	2.56	24
Belgium	BNP Paribas SA	1	2.52	66
Belgium	Banque Degroof SA	0	1.56	13
Brazil	Government of Brazil (Banco do Brasil)	1	24.63	17
Brazil	The Bank of New York Mellon Corp.	1	7.97	1
Brazil	Banco Opportunity SA	0	5.88	4
Brazil	Credit Suisse Group AG	1	1.03	4
Brazil	Dynamo Administração de Recursos Ltda.	0	0.85	1
Canada	Power Corp. of Canada (IGM Financial)	0	56.73	111
Canada	Royal Bank of Canada	1	40.66	54
Canada	Bank Of Nova Scotia (The) - Scotiabank	1	21.91	41
Canada	Macquarie Group Ltd.	1	16.29	21
Canada	FMR LLC (Fidelity)	0	12.74	34
China	China Merchants Securities Co. Ltd.	0	6.02	3
China	Invesco Great Wall Fund Management Co. Ltd.	0	5.90	7
China	China Post & Capital Fund Management Co., Ltd.	0	5.43	2
China	Yinhua Fund Management Co. Ltd.	0	4.54	4
China	Lion Fund Management Co. Ltd.	0	4.33	2
Denmark	Nordea Bank AB	1	5.31	21
Denmark	Danske Bank A/S	1	4.51	28
Denmark	BI Holding A/S	0	2.90	11
Denmark	Sparinvest Holdings A/S	0	2.83	13
Denmark	Aberdeen Asset Management Plc	0	2.83	6
Finland	Nordea Bank AB	1	8.54	20
Finland	Pohjola Bank Plc	1	4.33	14
Finland	Danske Bank A/S	1	2.69	23
Finland	FIM Group Oyj	0	1.66	17
Finland	Svenska Handelsbanken AB	1	1.24	8
France	Rue de la Boetie SAS (Crédit Agricole)	1	34.76	149
France	Carmignac Gestion SA	0	16.77	4
France	BPCE SA - Banque Populaire, Caisse d'Epargne (Natixis)	1	16.23	119
France	BNP Paribas SA	1	12.99	89
France	LCF Rothschild Group	0	12.75	35
Germany	Deutsche Bank AG	1	50.59	69
Germany	Allianz SE	0	20.23	42
Germany	Union Asset Management Holding AG / Union Gruppe	0	19.15	21
Germany	DekaBank Deutsche Girozentrale	1	13.54	27
Germany	Lingohr & Partner Asset Management GmbH	0	2.99	9

Table IA.1: continued

Country	Ultimate Owner	Bank Affiliated	TNA ($billion)	Number of Funds
India	Reliance Capital Ltd.	0	7.69	15
India	Housing Development Finance Corp. Ltd.	1	4.30	10
India	UTI Asset Management Co. Ltd.	0	3.58	20
India	Franklin Resources, Inc. (Franklin Templeton)	0	3.18	15
India	Birla Sun Life Asset Management Co. Ltd.	0	2.61	21
Italy	Intesa Sanpaolo SpA (Eurizon Financial Group)	1	8.59	25
Italy	Asset Management Holding SpA (Anima Holding)	0	8.13	19
Italy	Unione Di Banche Italiane Scpa-Ubi Banca	1	3.17	8
Italy	UniCredit SpA (Pioneer)	1	2.97	8
Italy	Arca SGR SpA	0	2.95	13
Japan	Daiwa Securities Group Inc	0	16.05	96
Japan	Nomura Holdings Inc	1	12.80	95
Japan	FMR LLC (Fidelity)	0	7.68	36
Japan	HSBC Holdings Plc	1	5.65	12
Japan	Sumitomo Mitsui Trust Holdings, Inc.	1	5.59	65
Malaysia	Public Bank Bhd.	1	5.59	14
Malaysia	CIMB-Principal Asset Management Bhd.	1	1.27	18
Malaysia	Oversea-Chinese Banking Corp. Ltd. (Pacific Mutual Fund Bhd.)	1	0.32	11
Malaysia	OSK Holdings Bhd.	0	0.25	10
Malaysia	Hong Leong Co. Malaysia Bhd.	1	0.25	14
Netherlands	Cooperatieve Centrale Raiffeisen-Boerenleenbank (Rabobank Group)	1	10.19	8
Netherlands	BNP Paribas SA	1	8.38	12
Netherlands	ING Groep NV	1	5.97	25
Netherlands	Delta Lloyd NV	0	3.61	6
Netherlands	Van Lanschot NV	1	1.83	6
Norway	Skagen AS	0	15.40	3
Norway	DnB NOR ASA	1	7.44	44
Norway	SpareBank 1 Gruppen AS	1	5.04	13
Norway	Storebrand ASA	0	3.93	24
Norway	Government of Norway (KLP / KBN)	1	2.42	8
Poland	Aviva Plc	0	2.02	2
Poland	BZ WBK Asset Management SA	0	1.25	3
Poland	UniCredit SpA (Pioneer)	1	1.19	4
Poland	ING Groep NV	1	1.13	5
Poland	Legg Mason, Inc.	0	0.53	1
Portugal	Banco BPI SA	1	0.59	6
Portugal	Caixa Geral de Depósitos SA	1	0.58	10
Portugal	F&C Asset Management Plc	0	0.45	8
Portugal	Santander AM Holding SL / Banco Santander SA	1	0.27	10
Portugal	Banco Espírito Santo SA	1	0.23	7
Singapore	Schroders Plc	0	1.67	12
Singapore	United Overseas Bank Ltd. (Singapore)	1	1.47	24
Singapore	Aberdeen Asset Management Plc	0	1.01	10
Singapore	Oversea-Chinese Banking Corp. Ltd.	1	0.96	20
Singapore	Deutsche Bank AG	1	0.70	6
South Africa	Insite Service Management Ltd. (Orbis)	0	3.90	1
South Africa	Nedbank Group Ltd.	1	3.74	17
South Africa	Standard Bank Group Ltd.	1	2.73	19
South Africa	Investec Ltd. (Investec Bank Ltd.)	1	2.64	8
South Africa	Coronation Fund Managers Ltd.	0	2.12	8
Spain	Grupo Entrecanales SA / Acciona (Bestinver)	0	3.29	3
Spain	Santander AM Holding SL / Banco Santander SA	1	2.44	23
Spain	Banco Bilbao Vizcaya Argentaria SA	1	1.56	18
Spain	Caja de Ahorros y Monte de Piedad de Madrid / Caja Madrid (Bankia)	1	0.83	45
Spain	Caja de Ahorros y Pensiones de Barcelona / La Caixa (Invercaixa)	1	0.74	20

Table IA.1: continued

Country	Ultimate Owner	Bank Affiliated	TNA ($billion)	Number of Funds
Sweden	Swedbank AB	1	44.76	75
Sweden	Skandinaviska Enskilda Banken AB	1	11.27	25
Sweden	Svenska Handelsbanken AB	1	9.92	17
Sweden	Nordea Bank AB	1	9.87	19
Sweden	AMF Pensionsförsäkring AB	0	6.27	7
Switzerland	UBS AG	1	11.20	45
Switzerland	Swisscanto Holding AG	0	6.83	22
Switzerland	Credit Suisse Group AG	1	6.82	24
Switzerland	Pictet & Cie	0	2.19	10
Switzerland	Bank Sarasin & Cie. AG	0	2.05	7
Taiwan	JPMorgan Chase & Co., Inc.	1	2.47	19
Taiwan	Yuanta Financial Holding Co. Ltd.	0	1.63	17
Taiwan	Prudential Financial, Inc.	0	1.54	18
Taiwan	Cathay Securities Investment Trust Co. Ltd.	0	1.53	8
Taiwan	Allianz SE	0	1.40	7
Thailand	Kasikornbank Public Co. Ltd.	1	1.61	15
Thailand	Siam Commercial Bank Public Co. Ltd.	1	1.44	15
Thailand	Bangkok Bank Public Co. Ltd.	1	0.42	9
Thailand	Aberdeen Asset Management Plc	0	0.35	7
Thailand	TMB Bank Public Co., Ltd.	1	0.34	4
United Kingdom	Prudential Plc	0	44.98	36
United Kingdom	Invesco Ltd.	0	44.52	31
United Kingdom	FMR LLC (Fidelity)	0	32.16	31
United Kingdom	Schroders Plc	0	27.48	38
United Kingdom	Ameriprise Financial, Inc.	0	25.12	31
United States	The Capital Group Cos., Inc.	0	673.39	16
United States	FMR LLC (Fidelity)	0	535.26	165
United States	T. Rowe Price Group, Inc.	0	191.38	59
United States	Franklin Resources, Inc. (Franklin Templeton)	0	127.02	48
United States	Wellington Management Co. LLP	0	121.80	59

Table IA.2
Mutual Fund Performance and Bank-Affiliated Funds: Market Downturns

This table presents ordinary least squares (OLS) of fund risk-adjusted performance. The dependent variable is the alpha from the Carhart four-factor model in each quarter. *Bank Affiliated* is a dummy that takes a value of one if the ultimate owner of the fund's management company is a commercial banking group, and zero otherwise. *Bear Market* is a dummy that takes a value of one in the 2000-2002 and 2008-2009 periods, and zero otherwise. *Investment Region Return* is the stock market return in the fund's investment region. The regressions also include domicile country and quarter fixed effects. All control variables are lagged by one period. Variable definitions are provided in Table A.1 in the Appendix. The sample consists of actively managed domestic equity mutual funds in the 2000-2010 period. Robust *t*-statistics adjusted for clustering at the ultimate owner level are reported in parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)
Bank-Affiliated	-0.1170***	-0.1850***
	(-2.91)	(-5.82)
Bank-Affiliated × Bear Market	-0.1420*	
	(-1.81)	
Bank-Affiliated × Investment Region Return		0.0184***
		(2.61)
Investment Region Return		-0.1680***
		(-9.55)
TNA (log)	-0.0509***	-0.0517***
	(-4.73)	(-4.79)
Family TNA (log)	0.0423***	0.0419***
	(4.74)	(4.69)
Age (log)	-0.0327	-0.0337
	(-1.32)	(-1.36)
Total Expense Ratio	-0.0306	-0.0330
	(-0.78)	(-0.84)
Total Load	-0.0231***	-0.0234***
	(-2.78)	(-2.82)
Flow	0.0073***	0.0070***
	(5.95)	(5.72)
Number of Countries of Sale	-0.0053	-0.0047
	(-0.39)	(-0.34)
Team Managed	-0.1020***	-0.1020***
	(-3.22)	(-3.22)
Past Performance	0.0260***	0.0262***
	(6.06)	(6.12)
Number of Observations	127,880	127,880
R-squared	0.145	0.146

Table IA.3
Portfolio Weight Regressions

This table presents ordinary least squares (OLS) of fund portfolio weights. The dependent variable in the regressions is the fund's U.S. dollar investment in a stock as a percentage of total net assets of the fund. *Bank Affiliated* is a dummy that takes a value of one if the ultimate owner of the fund's management company is a commercial banking group, and zero otherwise. *Client Stock* is a dummy that takes a value of one if the stock holding is from a fund's parent bank lending client. The regressions also include domicile country and quarter fixed effects. Fund-level controls include size, family size, age, total expense ratio, total load, flow, number of countries of sale, team managed, and past performance. Stock-level control variables include firm size, book-to-market, stock return, stock volatility, and leverage. All control variables are lagged by one period. Variable definitions are provided in Table A.1 in the Appendix. The sample consists of actively managed domestic equity mutual funds in the 2000-2010 period. Robust *t*-statistics adjusted for clustering at the ultimate owner level are reported in parentheses. *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bank Affiliated	0.1800*	0.2090**	-0.0722**	-0.0536	-0.0648***	-0.0466**	-0.0474	-0.0381
	(1.78)	(1.99)	(-1.98)	(-1.45)	(-3.07)	(-2.36)	(-1.20)	(-0.95)
Client Stock	0.3390*		0.1980**		0.2050***		0.1010*	
	(1.94)		(2.19)		(3.30)		(1.77)	
Top 10 Client Stock		1.6890***		0.9060***		0.8380***		0.4940***
		(11.44)		(5.93)		(5.79)		(6.33)
Size (Log)			0.3090***	0.3100***	0.3090***	0.3100***	0.2360***	0.2350***
			(21.99)	(22.02)	(18.13)	(18.11)	(20.10)	(20.09)
Book-to-Market			0.0219	0.0230	0.0277**	0.0291**	-0.0285***	-0.0286***
			(1.40)	(1.48)	(2.14)	(2.25)	(-3.14)	(-3.16)
Stock Return			0.0010***	0.0010***	0.0012***	0.0012***	0.0013***	0.0013***
			(4.76)	(4.75)	(5.54)	(5.53)	(9.38)	(9.38)
Stock Volatility			-0.0002	-0.0002	-0.0002	-0.0002	-0.0005***	-0.0005***
			(-1.08)	(-1.23)	(-1.42)	(-1.61)	(-4.16)	(-4.22)
Leverage			-0.1360***	-0.1310***	-0.1130***	-0.1080***	0.0305**	0.0303**
			(-7.94)	(-7.74)	(-9.30)	(-9.05)	(2.37)	(2.36)
Fund-Level Controls	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Quarter Fixed Effects	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Domicile Country Fixed Effects	No	No	Yes	Yes	No	No	Yes	Yes
Fund Benchmark Fixed Effects	No	No	Yes	Yes	No	No	No	No
Stock Industry Fixed Effects	No	No	Yes	Yes	Yes	Yes	No	No
Fund Fixed Effects	No	No	No	No	Yes	Yes	No	No
Stock Fixed Effects	No	No	No	No	No	No	Yes	Yes
Number of Observations	14,094,422	14,094,422	11,168,224	11,168,224	13,541,533	13,541,533	11,216,462	11,216,462
R-squared	0.006	0.007	0.303	0.303	0.488	0.489	0.364	0.364

CONCLUSION

The financial globalization and the substantial growth of the global mutual fund industry have expanded the investment opportunities for global investors. This fact led to the rise in the internationalization of firm ownership structures. In this dissertation, we show that foreign institutions perform as well as local institutions on average. However, we also find evidence for a local advantage in environments more favorable to the presence of information asymmetries.

Importantly, we also document that greater foreign institutional ownership fosters long-term investment in R&D, fixed capital and employment. Foreign portfolio investment also leads to significant increases in innovation productivity, total factor productivity, and shareholder value. This positive effect is explained by the monitoring role of foreign institutions when managers are entrenched.

Finally, we also show that different forms of ownership structure might have a pernicious effect for the outcomes of mutual fund investors. More specifically, we find that equity mutual funds run by asset management divisions of commercial banking groups worldwide underperform relative to unaffiliated funds and show that this underperformance is consistent with the existence of conflicts of interest by bank-affiliated funds supporting their lending division operations at the expense of fund investors.