Two Essays On The Diversity Of Foreign Institutional Investors

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Abstract

This thesis consists of two essays focusing on the diversity of foreign institutional investors and how it affects investees.

The first essay studies the heterogeneity of foreign investors' expertise. I identify the industry expertise of foreign institutional investors using the industry structure of their domestic stock market as an indicator. Foreign investors are labeled as advantaged if the firm's industry is one of their home country's Top 3 industries in terms of market capitalization. Using firm-level data across 70 non-U.S. countries between 2000 and 2017, I show that advantaged foreign ownership has a positive and long-term effect on firm value, while remaining foreign ownership has an insignificant or negative effect. I further identify two economic mechanisms through which the industry expertise of advantaged foreign investors may increase firm value: advantaged foreign investors are better monitors and bring greater knowledge spillovers. Finally, the positive effects of advantaged foreign investors on firm value are primarily due to operating improvements rather than changes in payout policy.

The second essay investigates how the diversity among foreign institutional investors affects corporate governance. Using U.S. firm-level data between 2001 and 2019, I examine the effect of foreign ownership diversity on board diversity. I construct multidimensional diversity measures and find that foreign ownership diversity positively affects board diversity, while domestic ownership diversity is negatively or insignificantly associated with board diversity. Furthermore, I show that firms with high board diversity have more patent counts. Overall, this essay suggests board diversity as a novel channel through which foreign institutional investors improve firm value.

Résumé

Cette thèse se compose de deux essais qui se concentrent sur la diversité et la diversité des investisseurs institutionnels étrangers et comment cela affecte les entreprises investies.

Le premier essai étudie l'hétérogénéité de l'expertise des investisseurs étrangers. J'identifie l'expertise sectorielle des investisseurs institutionnels étrangers en utilisant la structure sectorielle de leur marché boursier national comme indicateur. Les investisseurs étrangers sont étiquetés comme avantagés si l'industrie de l'entreprise est l'une des 3 premières industries de leur pays d'origine en termes de capitalisation boursière. En utilisant des données au niveau de l'entreprise dans 70 pays non américains entre 2000 et 2017, je montre que les investisseurs étrangers favorisés ont un effet positif et à long terme sur la valeur de l'entreprise, tandis que les investisseurs étrangers restants ont un effet insignifiant ou négatif. J'identifie en outre deux mécanismes économiques par lesquels l'expertise sectorielle des investisseurs étrangers favorisés peut augmenter la valeur de l'entreprise : les investisseurs étrangers favorisés sont de meilleurs contrôleurs et apportent de plus grandes retombées de connaissances. Enfin, les effets positifs des investisseurs étrangers favorisés sur la valeur de l'entreprise sont principalement dus à des améliorations opérationnelles plutôt qu'à des changements dans la politique de distribution.

Le deuxième essai examine comment la diversité parmi les investisseurs institutionnels étrangers affecte la gouvernance d'entreprise. En utilisant des données au niveau des entreprises américaines entre 2001 et 2019, j'examine l'effet de la diversité des investisseurs étrangers sur la diversité des conseils d'administration. Je construis des mesures de diversité multidimensionnelle et constate que la diversité des investisseurs étrangers affecte positivement la diversité des conseils d'administration, tandis que la diversité des investisseurs nationaux est associée de manière négative ou insignifiante à la diversité des conseils d'administration. De plus, je montre que les entreprises dont le

conseil d'administration est très diversifié ont plus de brevets. Dans l'ensemble, cet essai suggère la diversité des conseils d'administration comme un nouveau canal par lequel les investisseurs institutionnels étrangers améliorent la valeur de l'entreprise.

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Contribution of Authors

This thesis is comprised of two essays. Both essays are single-authored by Wei Yu Jiang and completed under the guidance of Wei Yu's two supervisors, Professor Francesca Carrieri and Professor David Schumacher.

Earlier versions of the first essay has been accepted/presented at the 2022 Southern Finance Association Annual Meeting (scheduled), the 2022 Financial Management Association Annual Meeting (scheduled), the 2022 European Financial Management Association Annual Meeting, the 2022 Annual Conference of the Multinational Finance Society, the 2022 Financial Markets and Corporate Governance Conference PhD Symposium, the 2022 Montreal Business Schools' PhD Symposium, and McGill Finance Brownbag Seminar.

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1 Introduction

In recent decades, the notion of diversity has been an issue of great interest in many disciplines, including ecology, physics, life, as well as social sciences. Cross-disciplinary research highlights diversity as "resource pool", demonstrating sustainability, stability, and resilience (Stirling [2007]). For the environment, protecting biodiversity helps us fight climate change and reduce natural hazards. For the society, promoting diversity and inclusion is integral to reducing inequality and fostering innovation.

In the corporate world, the rise of the internalization and the complexity of business activities obligates companies to deal with additional challenges due to variability in operations, technologies, and cultures (Roberson [2019]). Furthermore, the global demographic transition, for example, the aging population and the unbalanced population growth in different regions, compels organizations to effectively manage workforce diversity (Shore et al. [2018]; Roberson [2019]). To address the real world needs, researchers in management and business have also extensively studied the notion of diversity. The literature has shown that diversity of the top management team, the board of directors, and the workforce could promote innovation (Griffin et al. [2021]; An et al. [2021]; Ma et al. [2022]), lead to better decision making (Malenko [2014]; Kang et al. [2022]), and improve firm performance (Anderson et al. [2011]; Nielsen and Nielsen [2013]; Kim et al. [2013]). However, the diversity of shareholders, including institutional investors, remains largely under-explored.

In this thesis, I aim to shed light on the diversity of foreign institutional investors and how it affects the invested firm. Before going into the details on foreign investors, let me provide some research background on diversity in other fields of the natural and social sciences. I borrow the definition of diversity from archaeology: an attribute of any system whose elements may be apportioned into categories (Leonard and Jones [1989]; Stirling [2007]). Furthermore, research in social sciences has distinguished between different types of diversity: structural diversity and interactional diversity (Pike

and Kuh [2006]; Denson and Chang [2009]). Structural diversity refers to the proportion of diverse individuals while interactional diversity refers to the interactions between the diverse groups. An example of structural diversity is the percentage of black students enrolled in a class. To which extent black students interact with Asian students in a classroom is looking at interactional diversity. Making use of this classification, in the first essay, I study the structural diversity of foreign institutional investors, measured by the percentage of heterogeneous investors. In the second essay, I focus on the interactional diversity of foreign investors by exploring the interplay among diverse investors (Dasgupta et al. [2021]).

Foreign institutional investors are taking increasing market shares in global markets. For example, the average foreign institutional ownership across all the firms in the FactSet/LionShares database has increased from nearly 5% in 2000 to 15% in 2018 (Figure 1). Foreign institutional investors have been shown to be value-enhancing shareholders. They improve firm value (Ferreira and Matos [2008]), promote better corporate governance (Aggarwal et al. [2011]), increase stock liquidity (Ng et al. [2016]; Jiao and Sarkissian [2021]), bring greater innovation output (Bena et al. [2017]; Luong et al. [2017]), and improve stock price efficiency (Kacperczyk et al. [2021]).

The literature so far mainly focuses on the difference between domestic and foreign institutional investors. Foreign institutional investors have fewer business ties to portfolio firms and therefore are more independent monitors than domestic investors (Ferreira and Matos [2008]). They also act as a bridge and foster knowledge spillovers from their home country to the invested firm (Luong et al. [2017]).

Foreign institutional investors have been treated mainly as homogeneous in existing studies. However, obviously, not all foreign institutional investors monitor firms identically and bring knowledge spillover equally. Despite many dimensions of heterogeneity across foreign investors, little attention has been paid to the differences among them. A

few papers mention that investors' origin matters. For example, Aggarwal et al. [2011] argue that whether they come from a civil-law country or common-law country matters for the corporate governance of the invested firm. Luong et al. [2017] suggest that only investors from highly innovative countries improve firm innovation. Investors' holding also matters. Ng et al. [2016] find that only foreign investors holding less than 5% of the firm positively affects stock liquidity. This thesis complements and contributes to this literature by investigating the real effects on investees, first, of the industry expertise of foreign investors, and second, of the diversity among foreign investors.

In the first essay, I study foreign investors' heterogeneity by taking account of the characteristics of the invested firm. More specifically, the essay investigates whether one dimension of investors' heterogeneity, industry expertise, could benefit firms from the related industry. I infer the industry expertise of foreign institutional investors from the industry structure of their domestic stock market. Schumacher [2018] shows that when investing abroad, the foreign investors' overweight industries that are comparatively large in their domestic stock market, because of their information advantage. In other words, differences in industry structures across local stock markets could help to identify the comparative advantages of foreign investors. I label foreign investors as advantaged if the firm's industry is one of their home country's Top 3 industries in terms of market capitalization. Motivated by information asymmetry as an explanation for the foreign industry bias, prevalent in observed asset allocation, I hypothesize that advantaged foreign investors create more firm value than remaining foreign investors.

I test the hypothesis using firm-level data from 70 non-U.S. countries between 2000 and 2017. Both univariate and multivariate tests reveal that advantaged foreign ownership is positively associated with firm value while remaining foreign ownership is insignificantly or negatively correlated with firm value. Moreover, the tests using different identification strategies suggest that the positive effect of advantaged foreign ownership on firm value appears to be causal. Further tests indicate that advantaged foreign in-

vestors are better monitors and bring greater knowledge spillover than remaining foreign investors.

In the second essay, I study the interplay among heterogeneous foreign institutional investors (Dasgupta et al. [2021]) by focusing on their diversity explained from both demographic and cognitive factors. As mentioned above, existing studies in finance have focused on how the diversity of the top management team, the board of directors, and the workforce influence firm outcomes while the diversity of shareholders remains largely under-explored.

Given that the first essay and other studies (Aggarwal et al. [2011]; Bena et al. [2017]; Luong et al. [2017]) point out that monitoring is an important economic mechanism, I study closely the impact of foreign institutional investors on corporate governance in the second essay. More specifically, I investigate how the diversity among foreign shareholders affects the diversity of the board of directors.

In the first place, directors are elected by shareholders to represent their interests. The board attributes may simply reflect the attributes of ownership, as a direct consequence of shareholders' voting. However, the influence of shareholders on board elections is limited, given that the candidates are generally predetermined by the nomination committee of the current board. Due to the huge costs of proxy fights, shareholders' votes have little impact on director elections, especially for uncontested elections, and therefore diversity is unlikely to be the result of this mechanism (Cai et al. [2009]).

To test the impact of foreign ownership diversity on board diversity, I use U.S. firm-level data between 2001 and 2019 and construct multidimensional board and ownership diversity indices, by considering both demographic and cognitive heterogeneity. Both univariate and multivariate tests indicate that foreign ownership diversity is positively associated with board diversity. Furthermore, the tests using different identification

strategies suggest that the positive effect of foreign ownership diversity on board diversity is causal. I then show that board diversity improves firm innovation. Overall, the second essay proposes board diversity as a novel channel through which foreign investors improve firm value.

2 Foreign investors' industry expertise and firm value

2.1 Introduction

Foreign institutional ownership has been shown to improve firm value (Ferreira and Matos [2008]), promote better corporate governance (Aggarwal et al. [2011]), increase stock liquidity (Ng et al. [2016]; Jiao and Sarkissian [2021]), and bring greater innovation output (Bena et al. [2017]; Luong et al. [2017]). However, the literature largely treats all foreign investors as homogeneous. In reality, there are many dimensions of heterogeneity across foreign investors, among which their expertise is one of the most important. This heterogeneity matters because it may affect the investor's intervention decisions and effectiveness on the invested firm.

In this paper, I study foreign investors' industry expertise and how it affects firm value. I use industry structures of foreign investors' domestic stock markets as indicators to infer their expertise. Schumacher [2018] documents that when investing abroad, foreign investors overweight industries that are comparatively large in their domestic stock markets, using industry-level global market portfolios as benchmark (foreign industry bias). They choose to specialize in these industries in which they have initial information advantage (Nieuwerburgh and Veldkamp [2009]). It also suggests that differences in industry structures across local stock markets could help to identify the comparative advantages of foreign investors that may lead to superior information.

I label foreign investors as advantaged if the firm's industry is one of their home country's Top 3 industries in terms of market capitalization. Advantaged foreign ownership (FIO_A) is defined as the sum of shares owned by advantaged foreign investors divided by the firm's total number of shares outstanding; and remaining foreign ownership (FIO_R) is defined as total foreign ownership (FIO) minus advantaged foreign ownership (FIO_A).[1] Motivated by the specialized learning explanation of foreign in-

[1] See section 2.2.1 for more detailed definition.

dustry bias (Schumacher [2018]), I hypothesize that advantaged foreign investors are more effective in improving firm value than remaining foreign investors, because of their information advantage in the related industry.

To better illustrate foreign investors' industry-level information advantage, consider a Canadian firm: Cameco, the world's largest publicly traded uranium company (2-digit SIC code: 10, metal mining). An investor from Australia is identified as advantaged foreign investor for Cameco, since metal mining is one of the Top 3 industries in Australia. Another investor from Japan is categorized as remaining foreign investor since metal mining is not one of the Top 3 industries in Japan. The main goal of the paper is to study whether the Australian investor creates more firm value for Cameco than the Japanese investor.

I test the hypothesis using firm level data from 70 non-U.S. countries between 2000 and 2017. The univariate results suggest that sorting by advantaged foreign ownership, the average Tobin's Q of the firms in the highest tertile is 0.134 (8% of the sample average of Tobin's Q) higher than the average of Tobin's Q in the lowest tertile while sorting by remaining foreign ownership, the average Tobin's Q of the firms in the highest tertile is 0.226 (13% of the sample average of Tobin's Q) lower than the average of Tobin's Q in the lowest tertile. The multivariate regressions show that Tobin's Q increases by 0.175 when advantaged ownership changes from the lowest to the highest tertile, while the change in Tobin's Q is insignificant, both statistically and economically, when remaining ownership changes from the lowest to the highest tertile.

An important concern is that the results exist because foreign institutional ownership (advantaged and remaining foreign ownership) is endogenously determined. Advantaged foreign investors may choose to invest in firms with higher Tobin's Q. It is also possible that omitted time-varying firm level variables are correlated with firm value, even after controlling for firm fixed effects in the model specifications. To address endogeneity con-

cerns, I employ two complementary empirical strategies: first, an instrumental variable (IV) estimation, and second, a difference-in-differences design.

Since there are two endogenous variables, the two-stage least squares tests require at least two valid instrumental variables. First, I use stock inclusion in FTSE All-World index as instrument for foreign (advantaged and remaining) ownership. Index inclusion has been successfully and widely used in the related literature, such as Aggarwal et al. [2011] and Bena et al. [2017]. Second, I use country level strength of auditing and reporting standards as an instrument for foreign ownership.

For the relevance condition, institutional investors are more likely to invest in firms that are included in the market index and use these indices as benchmarks (Cremers et al. [2016]). Ferreira and Matos [2008] show that foreign institutions reveal a preference for better disclosure standards. In the first step of two-stage least squares test, both instrumental variables are jointly significant in explaining advantaged and remaining foreign ownership.

For the exclusion condition, since index inclusion is largely determined by a mechanical rule based on firms' market capitalizationn ranking, the increase of foreign ownership induced by index inclusion should be mainly exogenously determined. With respect to the country level auditing and reporting standard, their ranking should not be directly linked to firm value, except through foreign ownership changes.

The regression results using IV identification strategy suggests a positive and causal effect of advantaged foreign ownership on firm value, while the effect of remaining ownership is either insignificant or negative. The increase in advantaged foreign ownership generated by a one-standard-deviation increase in each instrumental variable leads to an increase of 0.158 in Tobin's Q (0.134 by univariate test and 0.175 by OLS regression). Furthermore, I redo the same empirical exercise by adding firm level lagged Tobin's Q as

a control to mitigate the concern that investors select higher firm value or other related firm characteristics in the previous period. The result of the causal effect of advantaged foreign ownership on firm value remains.

My second identification strategy exploits the passage of the Jobs And Growth Tax Relief Reconciliation Act (JGTRRA hereafter) of 2003 in the U.S. as a quasi-natural experiment. JGTRRA aims to substantially lower the dividend tax rate for firms in the U.S. and in countries that have tax treaties with the U.S.. This event should create exogenous variation of the U.S. foreign ownership for the firms domiciled in the U.S. tax treaty countries and which pay dividends. I then restrict the sample firms to the industries which are the Top 3 industries in the U.S. over the event period. In this way, the variation in the U.S. foreign ownership transfers to the variation in advantaged foreign ownership. The control group is represented by firms domiciled in the countries that do not have tax treaties with the U.S.. After verifying the parallel trend assumption before the event, I find that the increase of Tobin's Q of the treatment group is 0.272 (18% of the sample mean) higher than the increase of the control group around the passage of JGTRRA. To conclude, both IV estimation and DiD test suggest that the positive effect of advantaged foreign ownership on firm value appears to be causal.

I next examine the two possible economic mechanisms through which the industry expertise of advantaged foreign investors may increase firm value: monitoring channel and knowledge spillover. First, monitoring by advantaged foreign investors should be more effective than remaining investors. Specialized learning enables advantaged foreign investors to acquire industry-specific knowledge and relevant information to better monitor the firm, for example, management practice, industry trends, and competition (Wang et al. [2015]; Bradley et al. [2017]; Faleye et al. [2018]). Furthermore, their home portfolio is likely to cover the companies in their large home industries, which provides them with monitoring experience in the related industries. Along these lines, Kang et al. [2018] show that investors with activism experience in the firm's industry are effective

monitors. Taken together, I expect that advantaged foreign investors can improve firm value by providing better oversight of management's decisions.

To test whether industry expertise is valuable for monitoring channels, I classify both advantaged and remaining foreign investors based on their institution type (gray or independent institutions) and investment horizon (long-term or short-term institutions). Independent (or long-term) investors are more likely to actively intervene in the firm management than gray (or short-term) investors (Chen et al. [2007]). Consistent with this conjecture, the two-stage least squares tests show that the positive effect of independent (or long-term) foreign investors on firm value is largely driven by independent (or long-term) advantaged foreign investors, instead of their peers. The results suggest that advantaged foreign investors are more effective monitors than remaining foreign investors.

Second, industry expertise can facilitate and benefit knowledge spillovers. Luong et al. [2017] argue that foreign institutional ownership in general promotes knowledge spillover by acting as a facilitator in cross-border mergers and acquisitions (Ferreira et al. [2010]) or "as a bridge for a network of managers, investors and other stakeholders to exchange knowledge, ideas, and opportunities". Since knowledge spillover often occurs in a common industry (Marshall–Arrow–Romer and Porter knowledge spillover), advantaged foreign investors are in a better position than remaining investors to bring more valuable resources. Given that these industries are the largest ones in the investor's home country and are likely to be equipped with industry leaders, more industrial communications, and more efficient vertical network, i.e. supply chain and sale channels. It suggests that advantaged foreign investors can bring greater incoming knowledge spillovers from other companies in the same industry, which is shown to increase firm R&D investment and productivity than outgoing spillovers (Cassiman and Veugelers [2002]; Chen et al. [2013]). Hence, I expect that advantaged foreign investors can increase the firm's access to more valuable resources by bridging between the invested firm and their home indus-

try.

To test whether industry expertise of advantaged foreign investors is valuable for knowledge spillover channel, I classify both advantaged and remaining foreign investors based on the knowledge level of their country of origin ("high-knowledge" or "low-knowledge" countries). The knowledge spillovers from "high-knowledge" countries play a more important role than knowledge spillovers from "low-knowledge" countries (Luong et al. [2017]). Consistent with the conjecture, the two-stage least squares tests show that the positive effect of foreign investors from "high-knowledge" countries on firm value is largely driven by advantaged foreign investors from "high-knowledge" countries, instead of their remaining peers. The results suggest that advantaged foreign investors bring greater knowledge spillover than remaining investors.

Finally, I examine whether advantaged foreign investors bring real improvement in firm operations or improve firm value by changes in payout policy. I test the effect of advantaged foreign ownership on different corporate actions and performance measures. On one hand, through both monitoring and knowledge spillover mechanisms, industry experts should help the invested firm to engage more efficiently in R&D. Knowledge spillover channel also suggests that advantaged foreign investors could facilitate M&A. Consistent with these hypothesis, I find that advantaged foreign investors help to increase R&D investment and M&A activities. These investments are value-enhancing: firms with advantaged foreign investors receive more patents. Moreover, the results also suggest that advantaged foreign investors increase firm's productivity and total sales. On the other hand, I find no evidence that advantaged foreign investors have significant effects on dividend payout ratio and stock repurchases. Taken together, the results suggest that the positive effects of advantaged foreign investors on firm value are primarily due to real improvements in firm operations.

This study makes several contributions to the literature. First, this paper highlights

the importance of foreign ownership heterogeneity. The literature has shown that foreign institutional ownership promote better corporate governance (Aggarwal et al. [2011]), increase stock liquidity (Ng et al. [2016]; Jiao and Sarkissian [2021]), and bring greater innovation output (Bena et al. [2017]; Luong et al. [2017]). While much research treats foreign ownership as homogeneous, only few works distinguish different traits of foreign investors. For example, the country of origin of the foreign investors matters. Aggarwal et al. [2011] show that only the ownership from common law countries promotes better governance for the invested firms. Luong et al. [2017] find that the positive effect of foreign institutional ownership on firm's patent counts, and citations are mostly driven by institutions from high-innovation foreign countries. Moreover, Ng et al. [2016] distinguish foreign investors by the size of their ownership stake and show that FDI (foreign direct investment) ownership is negatively, while FPI (foreign portfolio investment) ownership is positively, associated with stock liquidity.[2] This paper adds another dimension to this literature by showing that foreign investors' industry expertise matters for the effectiveness of their interventions in the invested firm.

Second, to my knowledge, this paper is the first to shed light on the real effects of foreign bias. Foreign investors prefer to invest heavily in the countries which are mostly geographically close (Grinblatt and Keloharju [2001]; Portes and Rey [2005]), mostly economically close (Lane and Milesi-Ferretti [2008]; Andrade and Chhaochharia [2010]; Karolyi et al. [2020]) and mostly culturally close (Grinblatt and Keloharju [2001]; Beugelsdijk and Frijns [2010]; Aggarwal et al. [2012]) to them. While the international finance literature has documented different forms and explained several reasons for foreign bias, I add to the foreign bias literature by suggesting that foreign investors with industry bias are optimal for the real economy because the industry expertise acquired through specialized learning enables them to effectively intervene in the firm's operations.

[2] Ng et al. [2016] define FDI ownership if the investor owns at least 5% of a firm's outstanding shares and FPI ownership if the investor owns less than 5%.

Third, this study provides new evidence to the emerging literature that investigates how the industry expertise of different economic agents play a role in corporate and financial markets. The literature has shown that industry expertise contributes to the work of CEO (Custódio and Metzger [2013]), directors (Wang et al. [2015]; Faleye et al. [2018]), blockholders (Kang et al. [2018]), venture capitalists (Bottazzi et al. [2008]; Gompers et al. [2008]), M&A advisor (Wang et al. [2022]) and analysts (Bradley et al. [2017]). For example, Faleye et al. [2018] show that directors with industry expertise can help firm managers to make better decisions on R&D investment because they increase managers' access to key industry players and relevant information. Kang et al. [2018] argue that institutions with multiple blockholdings in the same industry are effective monitors because commonality of firms' businesses in the same industry enables institutions to "accumulate industry-specific knowledge and relevant information to monitoring firm". This paper is the first to study the industry expertise of foreign investors and shows that industry expertise is also valuable for foreign investors when monitoring firm's management and bridging knowledge transfer between their home industries and the invested firm.

Finally, this work has practical implications for the local government fostering foreign investment. Since the industry expertise of foreign investors can bring real improvement to the invested firm, the government should implement policies that favor investors with related industry knowledge. The industry structure of the investor's home country could serve as a useful indicator when identifying valuable investors.

The reminder of the paper is organized as follows. Section 2 presents the institutional ownership data and other variables. Section 3 shows the main results of baseline regressions. In Section 4, I address the identification issue by using two-stage least squares tests with instrumental variables and difference-in-differences approach. In Section 5, I validate two economic mechanisms through which advantaged foreign investors improve firm value. Section 6 studies the real effects of advantaged foreign investors on corporate

actions and operation performance. The last section concludes.

2.2 Data and variables

I construct the key and control variables mainly from two databases: institutional ownership from FactSet/Lionshares database and firm level control variables from DataStream/WorldScope. Because FactSet/Lionshares ownership data are available from 1999, the sample periods start from 2000. The initial sample consists of all the non-U.S. firms in DataStream/WorldScope database excluding financial sector (SIC codes 6000-6999) from 2000 to 2017. I merge the sample of firms with year average institutional holdings data from FactSet/Lionshares, using identifiers ISIN, SEDOL, and CUSIP.

2.2.1 Institutional ownership

I use FactSet/LionShares ownership database to construct yearly firm-level institutional ownership. This database collects the mandatory quarterly holding reports of institutional investors required by regulatory agencies and has been widely used in international finance literature (Ferreira and Matos [2008]; Aggarwal et al. [2011]; Ng et al. [2016]; Bena et al. [2017]; Luong et al. [2017]; Kacperczyk et al. [2020]).

FactSet/LionShares also provides the information on the fund and firm domicile, and the type of institution. Following Schumacher [2018], I identify the domestic and foreign investors based on the country of residence of the fund's management company. An institution is labeled as foreign investor if they are domiciled in a country different from where the stock is listed and as domestic investor, otherwise. As in the literature, the ownership (%) is calculated as the number of shares held by the institutional investors divided by the firm's total number of shares outstanding.

The type of institution is used to identify independent and gray institutions. Mutual

funds, hedge funds, and investment advisers are classified as independent investors while bank trusts, insurance companies, pensions funds and endowments as gray institutions (Brickley et al. [1988]; Chen et al. [2007]; Ferreira and Matos [2008]). Brickley et al. [1988] and Chen et al. [2007] argue that the independent institutions tend to monitor the firm management because they do not seek business relationships with the invested firms, while gray institutions are less willing to challenge the management decisions since they might need to protect the existing or potential business relationships with the invested firms.

The total sample of institutional ownership consists of 12,064 distinct institutions from 93 countries holding 44,125 firms from 130 non-U.S. countries, from 2000 to 2017. Let IO_TOTAL denote the total institutional ownership of firm, DIO denote the total domestic institutional ownership, FIO denote the total foreign institutional ownership (IO_TOTAL=DIO+FIO).

Advantaged foreign ownership I label foreign investors as advantaged if the firm's industry is one of their home country's Top 3 industries in terms of market capitalization, following Schumacher [2018]. I decompose the foreign ownership into two parts: advantaged ownership (FIO_A) and remaining ownership (FIO_R). Advantaged foreign ownership is defined as the number of shares held by advantaged foreign investors divided by the total number of shares outstanding. Remaining foreign ownership is defined as total foreign ownership minus advantaged foreign ownership ($FIO - FIO\_A$).

Let f denote firm, j denote institution, and t denote time. The industry size in a country is the sum of the market value of all the firms in the industry (2-digit SIC) of the country in the DataStream/Worldscope. I identify the Top 3 industries in a country by sorting the industry size of all the industries in the country. Let $I(h_{j,t}, 3)$ denote the set of the top 3 industries in country h (home country of fund j) based on market

size at time t, and $i(f)$ denote the industry (2-digit SIC) of firm f. An institution j from country h is an advantaged foreign investor for a firm f in country c, based on the industry structure of the institution's home country:

$$\mathbb{1}_{A_{f,j,t}} = \begin{cases} 1 & i(f) \in I(h_{j,t}, 3) \\ 0 & otherwise \end{cases} \tag{1}$$

The advantaged (remaining) foreign ownership can be written as following:

$$FIO\_A_{f,t} = \sum_j \mathbb{1}_{A_{f,j,t}} * FIO_{f,j,t} \tag{2}$$

$$FIO\_R_{f,t} = \sum_j (1 - \mathbb{1}_{A_{f,j,t}}) * FIO_{f,j,t} \tag{3}$$

I calculate the size of the industries in a country by pulling out the full universe of firms in Worldscope. For each industry in a country, the industry size is the sum of the market value of all the firms in Worldscope. I then rank the industries in a country, from the largest to the smallest, according to their size. If the firm's industry is one of the Top 3 industries in the institution's home country, the institution is labelled as advantaged foreign investor for this invested firm.

2.2.2 Other variables

The initial sample consists of all the non-U.S. firms in DataStream/WorldScope database excluding financial sector (SIC codes 6000-6999) from 2000 to 2017 (50,814 firms from 108 countries). I merge Factset and DataStream/Worldscope by ISIN, SEDOL and CUSIP (48,531 matched firms). Following Ferreira and Matos [2008], the institutional ownership is set to be 0 if the firms cannot be matched in FactSet.

The firm level control variables, including logarithm of total asset (SIZE), sales growth (SGROWTH), leverage (LEV), cash (CASH), capital expenditure (CAPEX), ROA, R&D, property, plant and equipment (PPE), foreign sales (FXSALE), insider

ownership (CLOSE), ADR indicator (ADR) and industry classification (Primary SIC code), are also downloaded from DataStream/WorldScope. The number of analysts following the firm (ANALYST) is taken from I/B/E/S. Firm level patent counts data is downloaded from Global Corporate Patent Dataset.[3] I merge the firm sample with I/B/E/S and Global Corporate Patent Dataset using identifiers GVKEY, ISIN, SEDOL, and CUSIP. After filtering out firm-year observations with missing values, the final sample consists of 12,953 unique firms from 70 countries for a total of 82,646 firm-year observations.

Table 18 presents the summary statistics for regrouping the two databases. On average, the total ownership held by the institutional investors is 8.6%, 4.0% for domestic institutions and 4.6% for foreign institutions. Decomposing foreign ownership (equation 1), the advantaged investors count for 0.9% ownership of the firms, roughly 20% of the total foreign ownership.

Figure 2 shows the sample average advantaged foreign ownership by country while Figure 3 shows the time series of the sample average of advantaged and remaining foreign ownership. Figure 4 and Table 2 show the sample average of advantaged (remaining) foreign ownership by industry. The percentage of advantaged ownership on total foreign ownership is the highest in the Service sector and the lowest in Agriculture, Forestry, and Fishing sector. Advantaged foreign ownership is higher in developed countries (common law countries) than in emerging countries (civil law countries).

2.3 Main Results

In this section, I present the main results of baseline regressions and long-term effect of advantaged foreign ownership on firm value.

[3]See Bena et al. [2017] for details.

2.3.1 Baseline regressions: univariate and multivariate tests

To examine the relation between advantaged (remaining) foreign investors and firm value, I first look at the relation between the firm value and advantaged (remaining) foreign ownership in a univariate setting. I group firms by tertiles of advantaged foreign ownership (FIO_A) and remaining foreign ownership (FIO_R). Table 3 reports the average of Tobin's Q in the following year by FIO_A and FIO_R tertiles. T1, T2, and T3 denote the lowest, the medium, and the highest tertiles, respectively. The last row of the table shows the difference in Tobin's Q between the highest and lowest tertiles, T3-T1.

Table 3 shows that the following year average Tobin's Q of the firms in the highest FIO_A tertile is 0.134 (8% of the total sample average of Tobin's Q) higher than the average of Tobin's Q in the lowest tertile while the following year average Tobin's Q of the firms in the highest FIO_R tertile is 0.226 (13% of the total sample average of Tobin's Q) lower than the average of Tobin's Q in the lowest tertile. Thus, the univariate tests suggest a positive association between firm value and advantaged foreign ownership, and a negative association between firm value and remaining foreign ownership.

I then investigate the relation between the firm value and advantaged foreign ownership in a multivariate setting. I run panel regressions as below:

$$\begin{aligned} TobinQ_{f,t} = \alpha + \beta_{11} FIO\_A_{f,t-1} + \beta_{12} FIO\_R_{f,t-1} \\ + \beta_2 DIO_{f,t-1} + Controls_{f,t-1} + \gamma_f + \lambda_t + \epsilon_{f,t} \end{aligned} \tag{4}$$

where f denotes the firm, t denotes the time period. The dependent variable is firm value, measured by Tobin's Q. FIO denotes the foreign institutional ownership, FIO_A denotes the advantaged foreign investors' ownership, FIO_R denotes the remaining foreign investors' ownership, and DIO denotes the domestic institutional ownership. By definition, $FIO\_A + FIO\_R = FIO$. $Controls_{f,t-1}$ are lagged firm level information, including logarithm of total asset (SIZE), sales growth (SGROWTH), leverage (LEV), cash (CASH), capital expenditure (CAPEX), ROA, R&D, property, plant and equipment

(PPE), foreign sales (FXSALE), number of analysts following the firm (ANALYST), insider ownership (CLOSE) and ADR indicator (ADR). I include the firm fixed effects γ_f to control for time-invariant firm characteristics and the time fixed effects λ_t to control for changes in firm value affecting all firms simultaneously. In all regression, to compute the t-statistic of the coefficients, I use robust standard errors clustered at the firm level. By doing so, I assume that observations are independent across firms, but not within firms.

The results of multivariate tests are reported in Table 4. The dependent variable is firm value measured by Tobin's Q, computed as the total assets plus the market value of equity minus the book value of equity, divided by total assets (Ferreira and Matos [2008]; Aggarwal et al. [2011]). Column (1), (3) and (5) show the regressions results using only year fixed effects, while Column (2), (4) and (6) show the regressions results using firm and year fixed effects.

In Columns (1) and (2), the variables of interest are dummy variables indicating the tertiles of FIO_A and FIO_R. T2 and T3 are dummy variables that equal one if the value of the variable of FIO_A (FIO_R) belongs to the median and highest tertile, respectively. Comparing the results in Column (1) and (2), R squares of the regressions adding firm fixed effect (0.688 in Column (1)) are nearly 3 times of R square using only year fixed effects (0.227 in Column (2)). In fact, by using firm fixed effects, the regressions examine the relation of within firm changes in Tobin's Q and in advantaged foreign ownership. In other words, firm fixed effects control for the effects of the omitted time-invariant firm level characteristics which are both related to institutional ownership variables and Tobin's Q. Thus, I focus on the results interpretation of the results in Column (2) with firm fixed effects.

Consistent with the univariate test, the results in Column (2) indicate that in the following year, Tobin's Q increases by 0.175 (roughly 10% of the sample average To-

bin's Q) when FIO_A changes from the lowest to the highest tertile. Next year Tobin's Q increase by 0.075 when FIO_A changes from the lowest to the median tertile. The two coefficients are both statistically significant at 1% level, suggesting a monotonic and positive association between firm value and advantaged foreign ownership. Furthermore, the change in Tobin's Q is insignificant shifting from the lowest to the highest tertile of FIO_R. Tobin's Q increases only by 0.029 in the following year when FIO_R changes from the lowest to the median tertile. The results suggest a non-monotonic and less positive association between firm value and remaining foreign ownership.

Column (3) and (4) use the ordinal variables indicating the tertiles of FIO_A and FIO_R. The ordinal variable equals to 1, 2 and 3 if the value of the variable of FIO_A (FIO_R) belongs to the lowest, median, and highest tertile, respectively. As discussed above, I focus on the results with firm fixed effects in Column (4). Consistent with the results in Column (2), the coefficient of FIO_A is positive and significant at 1% level. Switching from the present tertile to one tertile higher in FIO_A is associated with 0.086 increase in Tobin's Q. The coefficient estimate of FIO_R is insignificant.

In Column (5) and (6), FIO_A and FIO_R are the original variables, percentage of holdings of advantaged and remaining foreign investors to the firm's total capitalization. In order to make the coefficients comparable, I divide dependent variable (Tobin's Q), FIO_A and FIO_R by its standard deviation. As discussed above, I focus on the results with firm fixed effects in Column (6). The results indicate that 1-standard deviation increase in FIO_A leads to an increase of 0.041 standard deviation in Tobin's Q in the following year, which is roughly 1.5 times of the coefficients of FIO_R.

Regarding other firm-level control variables, the coefficient estimates on domestic ownership are significant and positive at 1% level using only time fixed effects, but insignificant after controlling for firm fixed effects. It suggests that the effect of domestic ownership on firm value is largely driven by time-invariant unobserved firm level vari-

ables. Firms with smaller market capitalization, higher sales growth rates, and holding more cash are associated with higher firm value.

The positive relation between advantaged foreign ownership and firm value can also be interpreted as the buying pressure brought by the (advantaged) foreign investors pushing up the stock price, especially when the market is not very liquid. To rule out the possibility of overvaluation, I test the regression (equation 2) for longer term, up to five years ahead and the results are in Table 5. Firm and year fixed effects are applied to all the regressions in Table 5. The dependent variable in Column (1) to (3), Column (4) to (6), Column (7) to (9) and Column (10) to (12) is firm-level Tobin's Q up ahead two years, three years, four years and five years, respectively.

Column (1), (4), (7), and (10) show the results using the dummy variables T2 and T3, which indicate the tertiles of FIO_A and FIO_R. The results in Column (1) and (4) indicate that the positive and monotonic relation between advantaged foreign ownership and firm value remain significant at 1% level up to 3 years ahead. The coefficient estimates on FIO_R are significant at 5% level up to 2 years ahead, insignificant after 3 years ahead. In Column (2), (5), (8), and (11), the variables of interest are ordinal variables indicating the tertiles of FIO_A and FIO_R. Consistent with the results using dummy variables, Column (2) and (5) demonstrate that the association between advantaged foreign ownership and firm value is positive and significant at 1% level up to 3 years ahead. The coefficient estimates on FIO_R using ordinal variables are always insignificant. In Column (3), (6), (9), and (12), FIO_A and FIO_R are the original variables, percentage of holdings of advantaged foreign investors and remaining investors to the firm's total capitalization. Using the original variables, the results reveal that the association between advantaged foreign ownership and firm value is positive and significant at 1% level up to 2 years ahead, positive and significant at 10% level up to 3 years ahead and become insignificant afterward. The coefficient estimates on FIO_R are significant at 5% level up to 2 years ahead, insignificant for 3 years ahead, and become

significant and negative after 4 years ahead. To conclude, the long-term results suggest that buying pressure brought by advantaged foreign investors at short-term should not be a concern.

Overall, the baseline regression results indicate that the coefficient estimates on FIO_A are positive and significant at 1% level across all specifications, suggesting a monotonic positive association between advantaged foreign ownership and firm value. This relationship remains positive and significant up to 3 years ahead. For the coefficients of FIO_R, the results are mixed and suggest that there is no clear evidence for the relation between remaining foreign ownership and firm value. The results from univariate, multivariate, and long-term effect tests are consistent with the hypothesis that advantaged foreign investors are more effective in improving firm value than remaining foreign investors.

2.4 Identification tests

The evidence so far suggests a positive relationship between advantaged foreign ownership and firm value. However, an important concern is that the results exist because advantaged foreign ownership is endogenously determined. Advantaged foreign investors may choose to invest in the firms with higher Tobin's Q. It is also possible that unobservable time-varying firm-level variables are correlated with firm value, even after controlling for firm fixed effects in the model specifications. In addition, ownership variables are subject to measurement errors, if they are used as proxies for investors' monitoring ability or knowledge level. To address the simultaneity bias, omitted variable problem, and measurement error, I employ instrumental variables and difference-in-differences identification strategy to isolate the exogenous variation in institutional ownership.

2.4.1 Instrumental variables

Since there are two endogenous variables, the two-stage least squares tests require at least two valid instrumental variables to ensure that predicted values in the first step are not collinear with the non-problematic regressors. A qualified instrument should satisfy both relevant and exclusion conditions. Relevance condition means that the instrument is able to explain institutional ownership, after controlling for all other variables in the original regression, which can be tested for the weak IV problem. Exclusion condition means that the instrumental variables should only impact the firm value through institutional ownership. However, exclusion condition is untestable, which needs to be motivated by economic arguments.

I first use the stock inclusion in FTSE All-World index as an instrumental variable for foreign ownership (both advantaged and remaining foreign ownership). FTSE All-world index, a market-capitalization weighted index, is found in 1986 and covers 90-95% of the global investable market capitalization. Foreign institutional investors are more likely to invest in the firms which are included in the market index (Ferreira and Matos [2008]) and to use these indices as benchmarks (Cremers et al. [2016]). Therefore, foreign ownership should increase with the inclusion in FTSE index, which is referred to as relevance condition. For the exclusion condition, the inclusion of FTSE All-World index is mainly driven by the ranking of firms' market capitalization. Therefore, the increases in foreign ownership induced by index inclusion should be plausibly exogenous. I define the instrument as a dummy variable ($FTSE$) that equals 1 if the firm is included in FTSE All-World index in year t, and 0 otherwise.

Second, I use country level strength of auditing and reporting standards as an instrumental variable for both advantaged and remaining foreign ownership. Ferreira and Matos [2008] show that all financial institutions reveal a preference for better disclosure standards. Aggarwal et al. [2005] argue that US funds invest more in emerging markets with stronger accounting standards. High disclosure quality reduces information

asymmetry, which allows the investors to efficiently allocate their capital, monitor the invested firms, and protect their investment. Moreover, country-level auditing quality is unlikely to be directly linked to the firm-level valuation, except through investors' ownership changes. I define the second instrument ($AUDIT$) as the ranking of countries according to the Strength of auditing and accounting standards provided by Global Competitiveness Report.

Table 6 and Table 7 report the results of IV estimation.[4] In Table 6, FIO_A, FIO_R, and DIO are ordinal variables, from 1 to 3, indicating the lowest to the highest tertile of advantaged foreign ownership, remaining ownership and domestic ownership, respectively. In Table 7, FIO_A, FIO_R, DIO are the original percentage variable of advantaged foreign ownership, remaining ownership and domestic ownership, scaled by variable's standard deviation (dependent variable is also scaled by its standard deviation). The firm level control variables are included in the first-stage tests. The second-stage tests are reported in Column (2) and (5) of each table. Sanderson-Windmeijer F-statistics for weak IV tests are reported at the bottom of each table.

For the first-stage test results in both tables, the coefficient estimates of $FSTE$ are positive and significant at 1% level for explaining FIO_A and FIO_R, which is consistent with the prediction. The coefficient estimates of $AUDIT$ are positive and significant at 1% level for explaining FIO_R, but display mixed results for explaining FIO_A. One possible explanation is that advantaged foreign investors are more informed than remaining foreign investors. Therefore, their investment decisions are less affected by the country level auditing quality. Overall, the instruments seem to be highly correlated with the endogenous variables. Sanderson-Windmeijer F-statistics are able to reject the null of weak instruments at 1% level.

[4] I exclude using FIO_A and FIO_R as dummy variables in IV estimation since it requires at least 4 instrumental variables.

For the second-stage results in both Table 6 and Table 7, the estimates on FIO_A are positive and significant at 1% level while the estimates on FIO_R are mostly negative and significant at 1% level. The coefficient in Column (5) of Table 6 suggests that the increase in predicted FIO_A generated by 1-standard-deviation increase in each of the instruments is associated with an increase in Tobin's Q of 0.158[5]. The 95% confidence interval of the overall effect is [0.071, 0.237], which overlaps with the 95% confidence interval of OLS regression results [0.042, 0.077] in Column (4) of Table 4. The coefficient in Column (5) of Table 7 suggests that the increase in predicted FIO_A generated by 1-standard-deviation increase in each of the instrument is also associated with an increase in Tobin's Q of 0.091 standard deviation[6]. The 95% confidence interval of the overall effect is [0.038, 0.137], which overlaps with the 95% confidence interval of OLS regression results [0.025, 0.057] in Column (6) of Table 4. Overall, the IV estimates are not significantly different from OLS regression results.

Although the 95% interval of OLS and IV estimates overlaps with each other, the economic magnitude of the effects from IV estimates seems to be greater than the effects estimated by OLS regressions. In fact, while the correlation of the omitted variables and firm value is unclear, the simultaneity bias implies that the OLS estimator should over-estimate the effects of FIO_A on Tobin's Q. One possible explanation is the "local average treatment effect" (LATE). The IV estimation estimates the effects of the treatment for those who respond to the exogenous shocks (Jiang [2017]). As a result, IV estimates could produce an effect larger than the true population. Another possible explanation is that measurement error in independent variable generally brings attenuation bias.[7] Furthermore, the effects of FIO_R are negative and significant at 1% level

[5]Using the first-stage test results in Colum (1) of Table 6, 1-stardard deviation increases in $FTSE$ and $AUDIT$ lead to an increase in FIO_A of 0.092*0.347 -0.000*28.067=0.032. The estimated change in Tobin's Q is 0.032*4.930=0.158.

[6]Using the first-stage test results in Column (1) of Table 7, 1-stardard deviation increases in $FTSE$ and $AUDIT$ lead to an increase in FIO_A of 0.158*0.347 -0.001*28.067=0.027. The estimated change in Tobin's Q is 0.027*3.359=0.091.

[7]In the test where I treat advantaged foreign ownership as the only endogenous variable, the coeffi-

by IV estimations while positive and insignificant by OLS estimations. Multivariate estimate captures the effect of each independent variable after partialing out the effects of other variables. Therefore, after partialing out the negative IV estimate of FIO_R, the IV estimate of FIO_A could be larger than OLS estimate.

Lagged Tobin's Q To mitigate the concern that the advantaged foreign investors choose to invest in the firms with higher valuation and related characteristics in the past period, I repeat the same empirical exercise by adding the lagged Tobin's Q in the regression. Table 8 reports the results of OLS regression and IV estimation. After controlling for lagged Tobin's Q, both OLS and IV coefficient estimates become smaller than the baseline specifications, but still positive and significant at 1% level. It suggests there seems to be simultaneity bias. However, the positive effect of advantaged foreign ownership on firm value remains even after controlling for lagged Tobin's Q. The estimates of FIO_R are either insignificant (OLS regression) or negative and significant at 1% level (IV estimation).

In summary, consistent with my hypothesis, the identification tests using IVs suggest that the positive effect of advantaged foreign ownership on firm value appears to be causal. However, it is important to mention that since neither of the two instrumental variables are perfectly exogenous to firm value and IV estimation has its own limitation, I cannot completely rule out the endogeneity problem and should be cautious when interpreting the results.

2.4.2 DiD: The passage of JGTRRA of 2003

Since IV estimation is not perfectly free of concern, to further verify the effect of advantaged foreign ownership is likely to be causal, I use the passage of JGTRRA of 2003 as a

cient of IV estimate of FIO_A is larger than OLS estimate.

quasi-natural experiment for a DiD test, following Luong et al. (2007) and Kacperczyk et al. (2020). JGTRRA is a U.S. tax law Congress passed on May 23, 2003, which lowers the tax on capital gains from rates of 8%, 10%, and 20% to 5% and 15%. The tax on dividends, which were taxed in the same bracket as the rest of the individual's income tax, has been cut to 15%. JGTRRA is also applied to the countries where there is tax treaty with the United States. Dividend gain tax from non treaty countries remain the same as before the passage of JGTRRA. It allows to construct the treatment group (firms domiciled in the U.S. tax treaty countries) and control group (firms domiciled in the U.S. tax non-treaty countries).

The passage of JGTRRA can be a suitable quasi-natural experiment because it should generate variation in foreign ownership, especially by attracting U.S. investors investing in non-U.S. firms located in the U.S. tax treaty countries. Moreover, lower dividend tax for the U.S. investors is unlikely to directly related to the non-U.S. firm's value. I use the DiD approach to compare the firm value of treatment group and control group 2 years before the event (2001 - 2002) and 2 years after the event (2004 - 2005).

I select the treatment firms and controls firm based on the information in two years before the passage of JGTRRA (2001). The treatment firms are firms located in the U.S. tax treaty countries and paid dividend in 2001. I then restrict the sample firms only from the industries which are Top 3 industries of U.S. from 2001 to 2005[8]. In such manner, the variation of U.S. ownership following the passage of JGTRRA create variation of advantaged foreign ownership for the treatment group during the sample period. There are 314 treatment firms in the sample. The controls group consists of firms located in the U.S. non tax treaty countries and paid dividend in 2001. It lefts 118 firms in the control groups. I match each control firm with 3 treatment firms using the nearest neighbor propensity score matching (PSM) algorithm. The firm-level control

[8]Sic code 28: chemical and allied products; Sic code 73: Business services. The two industries belong to Top 3 industries from 2001 to 2005.

variables used for the PSM are those with significant coefficients in the IV regression: FIO_A, $SIZE$, LEV, $CAPEX$, ROA and Q_{t+1}. The finale matched sample consists of 159 treated firms and 118 control firms. Table 9 shows the differences in mean of the matching variables of the two groups are insignificant after propensity score matching.

The validity of the DiD test depends on the parallel-trend assumption. I first compute the univariate difference between the treatment and control group for Tobin's Q, before 2003. The results in Panel A of Table 10 suggest that there is no significant difference between the trend of the two group in pre-treatment period. I also plot the average Tobin's Q of the two groups over the 5 years period. Figure 6 shows that the two lines before the passage of JGTRRA seem to be parallel and close to each other. Furthermore, the result in Panel C of Table 10 suggests that the univariate estimate of DiD between two groups is significant and that the exogenous increase in advantaged foreign ownership (U.S. ownership) after the passage of JGTRRA leads to increase in firm value.

I then perform DiD test in a multivariate regression framework:

$$\begin{aligned} TobinQ_{f,t} = \alpha + \beta TREAT_i \times POST_t + +\beta_2 FIO\_R_{f,t-1} + \beta_3 DIO_{f,t-1} \\ + Controls_{f,t-1} + \gamma_f + \lambda_t + \epsilon_{f,t} \end{aligned} \tag{5}$$

Where $TREAT$ is a dummy variable that equals 1 if the firm is in the treatment group and 0 if the firm is in the control group. POST is a dummy variable that equals 1 if it is after 2003 and 0 if it is before 2003. Controls are the same firm level control variables as in the baseline regression. γ_f is the firm fixed effect and λ_t is the year fixed effect. The coefficient β before $TREAT_i \times POST_t$ is the DiD estimator that captures the causal effect of the advantaged foreign ownership (FIO_A) on firm value.

Table 11 shows the results of DiD test. In column (1), the coefficient before $TREAT_i \times POST_t$ is positive and significant, which suggests that advantaged foreign ownership of the treated group increases after the passage of JGTRRA. Column (6) report the results

of Tobin's Q as dependent variable. The coefficient before $TREAT_i \times POST_t$ is positive and significant at 1% level. It suggests that the increase of Tobin's Q of the treatment group is 0.272 (18% of the sample mean) higher than the increase of the control group around the passage of JGTRRA.

In conclusion, the identification results of IV estimation and DiD tests help to alleviate largely the concern for the endogneity problem of the advantaged foreign ownership FIO_A. The positive effect of advantaged foreign ownership on firm value appears to be causal. However, since either IV estimation or DiD using the passage of JGTRRA is perfectly exogenous, the results need to be interpreted with caution.

2.5 Economic mechanisms

In this section, I test two possible economic mechanisms through which advantaged foreign investors affect firm value: monitoring channel and knowledge spillover. I show that the advantaged foreign investors are better monitors, and they bring greater knowledge spillovers.

2.5.1 Monitoring channel

Foreign institutional ownership in general has been shown to promote good corporate governance practices around the world (Aggarwal et al. [2011]) and enhance firm innovation through monitoring (Bena et al. [2017] and Luong et al. [2017]). In this subsection, I make the conjecture that industry expertise enables advantaged foreign investors to be better monitors, compared with remaining investors.

First, through specialized learning, advantaged foreign investors acquire industry-specific information, such as management practices, industry trends, competition, and risk in the related industry. (Wang et al. [2015]; Bradley et al. [2017]; Faleye et al.

[2018]; Kang et al. [2018]). I expect that the industry related knowledge could enable advantaged foreign investors to better understand the invested firm and evaluate the decisions made by management, which contributes to effective monitoring. Consistent with this view, Wang et al. [2015] show that prior industry working experience helps directors reduce firm's earning management, lower CEO excess compensation, and increase CEO turnover. The same reasoning has been applied to sell-side analysts (Bradley et al. [2017]) and M&A advisors (Wang et al. [2022]). These findings suggest that industry expertise achieved through specialized learning should help foreign investors to more effectively monitor the invested firms.

Second, since the firm's industry is one of the largest in the advantaged investors' home country, it is very likely that their portfolios have covered and monitored the local firms in the same industry. In other words, they have industry-specific monitoring experience. Because of commonality among the firms in the same industry, the past experience should enable advantaged foreign investors to better evaluate firm strategies and oversee the management. Kang et al. [2018] argue that institutions with multiple blockholdings in the same industry increase forced CEO turnover-performance sensitivity because institutions' prior activism experience help them reduce subsequent monitoring costs and gain monitoring effectiveness. This finding suggests that their past governance experience could help advantaged foreign investors to be effective monitors.

To test whether industry expertise is valuable for monitoring, I classify both advantaged and remaining foreign investors into independent and gray investors (Brickley et al. [1988]; Chen et al. [2007]; Ferreira and Matos [2008]), as well as long-term and short-term investors (Bushee [1998]; Chen et al. [2007]). The independent/gray institutions are identified based on the types of institutions: mutual funds and investment advisers as independent investors while bank trusts, insurance companies, pensions funds, and endowments as gray institutions. Brickley et al. [1988] and Chen et al. [2007] show that the independent institutions tend to monitor the firm management because they do not

seek business relationships with the invested firms, while gray institutions are less willing to challenge the management decisions since they might need to protect the existing or potential business relationships with the invested firms.

An investor is labeled as long-term if the the investor holds the shares of the invested firm for more than 1 year. A short-term investor is the investor who holds the shares of the invested firm for less than 1 year. Chen et al. [2007] prove that long-term institutional investors and independent investors are more likely to monitor the firms. Bushee [1998] shows that long-term investors reduce the managerial myopia while short-term investors induce the managerial myopia. If industry expertise contributes to effective monitoring, the effect of advantaged monitoring (independent / long-term) investors on firm value should be greater than the effect of remaining monitoring (independent / long-term) investors.

Table 12 shows the results of OLS and IV estimations by decomposing foreign ownership into independent (long-term) and gray (short-term) institutions. The dependent variable is next period firm value, measured by Tobin's Q. Column (1) and Column (4) present the results of OLS regressions and indicate that the coefficients of independent (long-term) foreign investors are positive and significant at 1% level while gray (short-term) institutions have an insignificant effect on firm value. Column (2) and (5) demonstrate that the coefficient estimates of advantaged monitoring (independent / long-term) investors (FIO_X_A) are more significant, both economically and statistically, than the coefficient estimates of remaining monitoring (independent / long-term) investors (FIO_X_R). Since our main interest is to compare different foreign monitoring investors, the two instruments ($FTSE$ and $AUDIT$) are used to predict advantaged monitoring (independent / long-term) ownership (FIO_X_A) and remaining monitoring (independent / long-term) ownership (FIO_X_R). Column (3) and (6) show that IV estimates of advantaged monitoring (independent / long-term) investors (FIO_X_A) are positive and significant at 1% level, while the estimates of remaining monitoring

(independent / long-term) ownership (FIO_X_R) are negative and significant at 1% level. Gray institutions seem to have an insignificant effect on firm value. These results provide evidence that monitoring is a valid channel through which advantaged foreign investors improve firm value and that advantaged foreign investors are better monitors than remaining investors.

Interaction with stock liquidity and ownership concentration In this subsection, I employ the existing theories which help to predict what determines the effectiveness of governance. On one hand, Kahn and Winton [1998] and Maug [1998] demonstrate that stock liquidity increase the shareholder's monitoring incentive since liquidity allows the investors to buy additional shares at a price that does not yet reflect their intervention. Moreover, Edmans [2009] show that liquidity enhance shareholder monitoring effectiveness through exit because liquidity allows them to trade more aggressively through their information. Motivated by these theories, I study the interaction term of stock liquidity and advantaged foreign ownership. If advantaged foreign investors improve firm value through monitoring, I should expect to see that this effect is more pronounced for the firm with higher stock liquidity. In other words, the coefficient estimates of the interaction term between stock liquidity and advantaged foreign ownership should be positive.

On the other hand, Noe [2002] and Edmans and Manso [2011] argue that the splitting a holding block among multiple shareholders creates free-rider problem and reduces intervention incentives. In addition, more diluted ownership structure weakens the voice of monitoring shareholders, by reducing the investor's stake size. Admati et al. [1994] show that diversified investors with tiny positions in multiple firms have little incentive to monitor. Standing on these arguments, I study the interaction term of ownership concentration and advantaged foreign investors. If monitoring is a valid channel, the effect of advantaged foreign investors should be more pronounced for the firms with more concen-

trated ownership structure and the coefficient of the interaction term should be negative.

Table 13 shows the results of these interaction terms. In Column (1) to (4), to measure stock illiquidity, I use Amihud illiquidity ratio ($Amihud$) and percentage of zero return days on total trading days in one year ($Zret$) . Consistent with the hypotheses, in Column (4), the coefficient estimate on interaction term of $Zret$ and FIO_A is negative and significant at 1% level. It suggests that the positive effect of advantaged foreign investors on firm value is more pronounced for the firms with higher stock liquidity. The result is consistent with the hypothesis that monitoring is a valid channel through which advantaged foreign investors affect firm value.

In Column (5) to (8) of Table 13, I use number of institutions holding the firm ($N\_institution$) and Herfindahl index (IO_HHI) as measures of ownership concentration. Consistent with the hypothesis, in Column (6) and (8), the coefficient estimate on interaction term between $N\_institution$ and FIO_A is negative and significant at 1% level, and the coefficient estimate on interaction term between IO_HHI and FIO_A is positive and significant at 10% level. These results indicate that the positive effect of advantaged foreign investors on firm value is more pronounced for the firms with more concentrated ownership structure, which is once again consistent with the hypothesis that monitoring is a plausible economic mechanism.

To conclude, the results in Table 12 and Table 13 provide evidence that advantaged foreign investors enhance firm value through monitoring. By decomposing monitoring ownership into advantaged and remaining parts, the tests support the hypothesis that advantaged foreign investors are better monitored than remaining investors to oversee the firm's management.

2.5.2 Knowledge spillover

Foreign institutional ownership in general has been shown to facilitate knowledge spillover by acting as a facilitator in cross-border mergers and acquisitions (Ferreira et al. [2010]) and as a bridge for a network of managers, investors, and other stakeholders to exchange knowledge, ideas, and opportunities (Luong et al. [2017]). In this subsection, I argue that advantaged foreign investors could bring greater knowledge spillovers, compared with remaining investors, because of their home country's industry structure and their industry expertise.

First, advantaged foreign investors are in a better position to bring more valuable resources to the invested firm. Knowledge spillover often occurs in a common industry (Marshall–Arrow–Romer and Porter knowledge spillover). By definition, the related industry is one of the largest industries in the advantaged investor's home country. Therefore, the advantaged investor's home country is likely to be equipped with key industry players, more industrial communications, such as industry conferences and exhibitions, and more efficient vertical networks, supply chains, and sale channels. In turn, advantaged foreign investors can bring more incoming knowledge spillover from other companies in the same industry, which is shown to increase firm R&D investment and productivity than outgoing spillover (Cassiman and Veugelers [2002]; Chen et al. [2013]). Based on these arguments, it is reasonable to believe that advantaged foreign investors can increase the firm's access to more valuable resources by building the bridge between the invested firm and their home industry.

Second, it is also reasonable to assume that the industry expertise of advantaged foreign investors could make the knowledge transfer more efficient because they are able to accurately identify the industry specific information gap. Consistent with this argument, Faleye et al. [2018] show that directors with industry expertise can help firm managers to make better decisions on R&D investment because they increase managers' access to key industry players and relevant information. Dass et al. [2014] point out that

directors from the firm's related upstream and downstream industries can help bridge the information gap and facilitate the firm's access to contacts in those industries. These findings suggest that industry expertise of advantaged foreign investors can improve the efficiency of knowledge spillover between the invested firm and their home industry.

To test whether home country industry structure and industry expertise of foreign investors leads to knowledge spillover channel, I classify both advantaged and remaining foreign investors based on their country of origin: innovation level and industry size. First, I label an investor as "high-knowledge" for the invested firm if the average R&D intensity across all firms in the industry (same as the firm's industry SIC code) of its home country is larger than the average R&D intensity across all firms in the firm's country-industry. Vice versa, I label an investor as "low-knowledge" for the invested firm if its home country-industry average R&D spending across all firms is smaller than the average R&D intensity in the firm's country-industry. If such industry is not a part of the investor's home country economy, I assign its average R&D intensity as 0. Second, I use the size (market value) of the industry as a proxy to measure the level of development of the industry in that country. I label an investor as "high-knowledge" for the invested firm if the size of the industry (same as the firm's industry SIC code) in the investor's home country is larger than the size of the firm's country-industry. Vice versa, I label an investor as "low-knowledge" for the invested firm if the size of the investor's home industry is smaller than the size of the firm's country-industry. If there is no such industry in the investor's home country, I assign its industry size as 0. If advantaged foreign investors promote greater knowledge spillovers to the invested firm, I should expect to see that the positive effect of advantaged "high-knowledge" foreign ownership on firm value is greater than the effect of remaining "high-knowledge" foreign ownership.

Finally, I classify both advantaged and remaining foreign investors based on economic development and law system of the institution's home country, since country's knowledge level may be correlated with its economic development and institutional environment.

The ownership is labeled as "high-knowledge" if the investor's home country is a developed country (common law country). The ownership is labeled as "low-knowledge" if the investor's home country is an emerging country (civil law country).[9] If advantaged foreign investors promote greater knowledge spillovers to the invested firm, I should expect to see that the effect of advantaged foreign investors from developed (common law) countries on firm value is more positive than the effect of remaining foreign investors from developed (common law) countries.

Table 14 reports the results of OLS and IV estimations by decomposing foreign ownership into higher R&D intensity (larger industry size) and lower R&D intensity (smaller industry size) ownership. Column (1) and (4) present the results of OLS regressions and indicate that foreign "high-knowledge" (higher R&D intensity / larger industry size) ownership affect the invested firm value to a larger extent than ownership from "low-knowledge" (lower R&D intensity / smaller industry size) countries. Column (2) and (5) demonstrate that the coefficient estimates of advantaged "high-knowledge" (higher R&D intensity / larger industry size) ownership (FIO_X_A) are more significant, both economically and statistically than the coefficients of remaining "high-knowledge" ownership (FIO_X_R). Since our main interest is to compare FIO_X_A and FIO_X_R, I use FTSE index membership ($FTSE$) and the firm's country auditing quality ($AUDIT$) as instruments for the two variables of interest. Column (3) and (6) show that IV estimates of advantaged "high-knowledge" (higher R&D intensity / larger industry size) ownership (FIO_X_A) are positive and significant at 5% level, while IV estimates of remaining "high-knowledge" (higher R&D intensity / larger industry size) ownership (FIO_X_R) is negative and significant at 5% level. The results suggest that the positive effect of foreign "high-knowledge" ownership (FIO_X) on firm value is largely driven by the advantaged "high-knowledge" foreign ownership (FIO_X_A), instead of remaining "high-knowledge" ownership (FIO_X_R).

[9]The information on the countries' legal system is downloaded from Central Intelligence Agency.

Table 15 reports the results of decomposing foreign ownership into investors from developed (common law) countries and emerging (civil law) countries. Consistent with the results in Table 14, the IV estimates in Column (3) and (6) indicate that advantaged foreign investors from developed (common law) countries (FIO_X_A) improve firm value, while the effects of remaining investors from developed (common law) countries countries (FIO_X_R) on firm value are either negligible or negative. This result once again provides evidence that advantaged "high-knowledge" foreign investors lead to a greater increase in firm value than remaining "high-knowledge" investors.

To conclude, the empirical results in Table 14 and 15 show that advantaged foreign investors from countries with valuable resources (more industry specific knowledge, developed and common law countries) contributes more to firm value than their remaining peers. Hence, these evidences suggest that knowledge spillover is a plausible mechanism and that advantaged foreign investors bring greater knowledge spillover from their home country to the invested firms, compared with remaining foreign investors.

2.6 Real effects

Till now, I have presented evidence in support of hypothesis that advantaged foreign investors have a positive and causal effect on firm value. In this section, I test the concrete impacts of advantaged foreign ownership on different corporate actions and performance measures. I show that advantaged foreign investors conduct real improvements in firm operations. Instead of "splitting the pie" in favor of shareholders, they "grow the pie" by improving firm innovation, productivity, and sales.

I first test the corporate investments in innovation. As discussed in the above section, through monitoring, industry expertise enable advantaged foreign investors to better evaluate the investment projects. Through knowledge spillover, advantaged foreign investors could act as bridges and connect the invested firms to other resources within the

same industry. Both economic mechanisms suggest that advantaged foreign investors could increase firm innovation output, by increasing the investment either in research and development or in mergers and acquisitions.

Table 16 displays the results of research and development investment, mergers and acquisitions cost, and innovation output (patent counts). Column (1) and (2) show the impact of advantaged foreign investors on firm R&D investment. The two-stage least square test in Column (2) indicates that one standard deviation increase in predicted advantaged foreign ownership leads to an increase of 0.6% in R&D investment, as a fraction of total asset (sample mean of 3%). Column (3) and (4) present the effect of advantaged foreign ownership on firm M&A spending. Using IV estimate in Column (4), one standard deviation increase in predicted advantaged foreign ownership leads to an increase of 19% in M&A spending. Finally, I test in Column (5) and (6) how advantaged foreign investors affect innovation output, measured by firm level patent counts. From IV estimate in Column (6), I find that one standard deviation increase in predicted advantaged foreign ownership leads to a 37% percent increase in patent counts. Overall, the results suggest that the advantaged foreign investors foster R&D investment and M&A activities and that the investments are valuable since the patent counts increase.

I then test two firm level performance measures: total factor productivity (TFP)[10] and total sales. Table 17 presents the results. Both OLS and IV estimates provide evidence that advantaged foreign ownership increases firm productivity and sales while remaining foreign ownership has a mixed effect, either negligible or negative, on productivity and sales. The results suggest that advantaged foreign investors conduct real improvement in firm's operations.

[10]See Schoar [2002] for example. I compute total factor productivity as the residual of the firm level regression $y_{f,i,t} = \alpha_i + \beta_i l_{f,i,t} + \gamma_i k_{f,i,t} + \delta_i m_{f,i,t} + \epsilon_{f,i,t}$, where $y_{f,i,t}$ is the logarithm of total sales of firm f in industry i at year t, $l_{f,i,t}$ is the logarithm of total number of workers, $k_{f,i,t}$ is the logarithm of total assets, $m_{f,i,t}$ is the logarithm of cost for material and other inputs, and $\epsilon_{f,i,t}$ is the residuals, measuring total factor productivity.

Finally, I test the impacts of advantaged foreign investors on payout policy. Through monitoring, advantaged foreign investors could mitigate agency cost and pressure the management to increase repurchases and dividends. However, I find no evidence that advantaged foreign investors urge managers to buyback more stocks or pay more dividends.

Taken together, the results provide evidence that the positive effects of advantaged foreign investors on firm value are mainly due to real improvements in firm innovation and operation performance rather than changes in payout policy.

2.7 Conclusion

This paper studies the heterogeneity of foreign investors' expertise by using industry structures of their local stock market as an indicator for their information advantage. I show the positive effects of advantaged foreign investors on firm value, using firm-level data from across 70 non-U.S. countries between 2000 and 2017. I identify the effects by exploiting the exogenous changes in foreign ownership driven by the inclusion of a stock in FTSE All World Index and country level auditing quality. I also employ DiD approach using the passage of JGTRRA of 2003 in U.S. as a quasi-natural experiment. Both baseline and identification tests suggest that advantaged foreign ownership has a positive, long-term, and causal effect on firm value while remaining foreign ownership has either a mixed effect, either insignificant or negative. I validate two economic mechanisms through which advantaged foreign investors may increase firm value: monitoring channel and knowledge spillover channel. I further show that advantaged foreign investors increase the firm investment in R&D and M&A and that the investment is valuable since they improve innovation output, productivity, and sales.

2.8 Figures

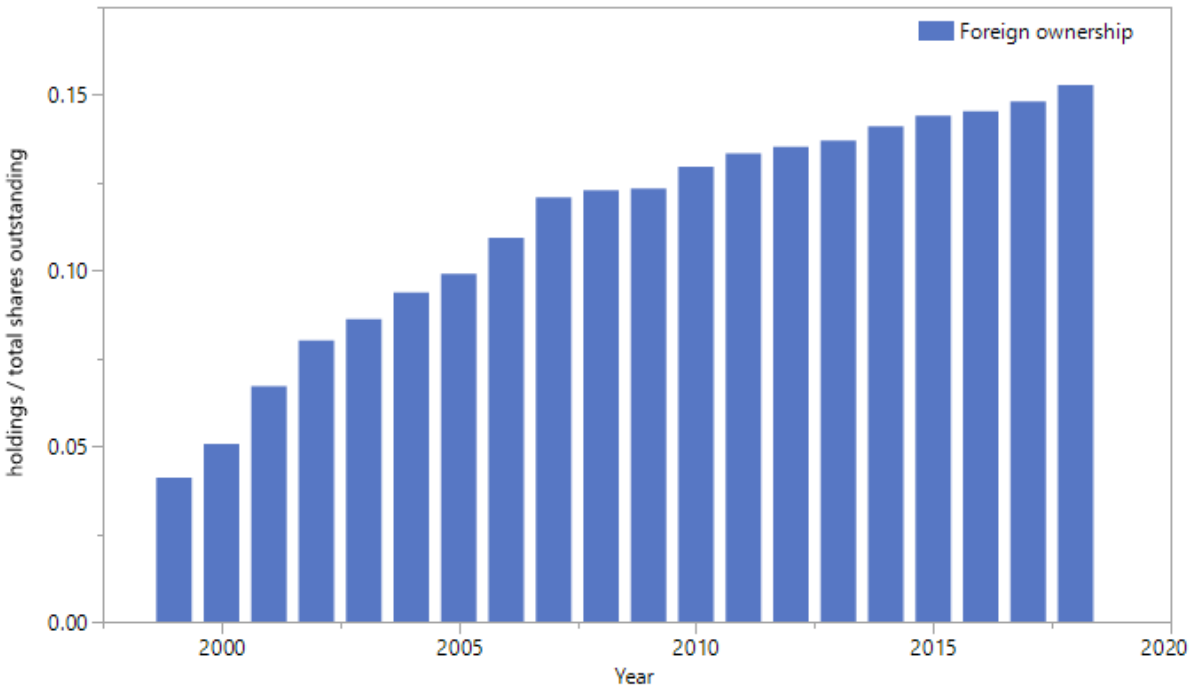


Figure 1: Average foreign institutional ownership (Sample: FactSet)
This figure plots the average foreign ownership (FIO) across all firms in FactSet from 1999 to 2018.

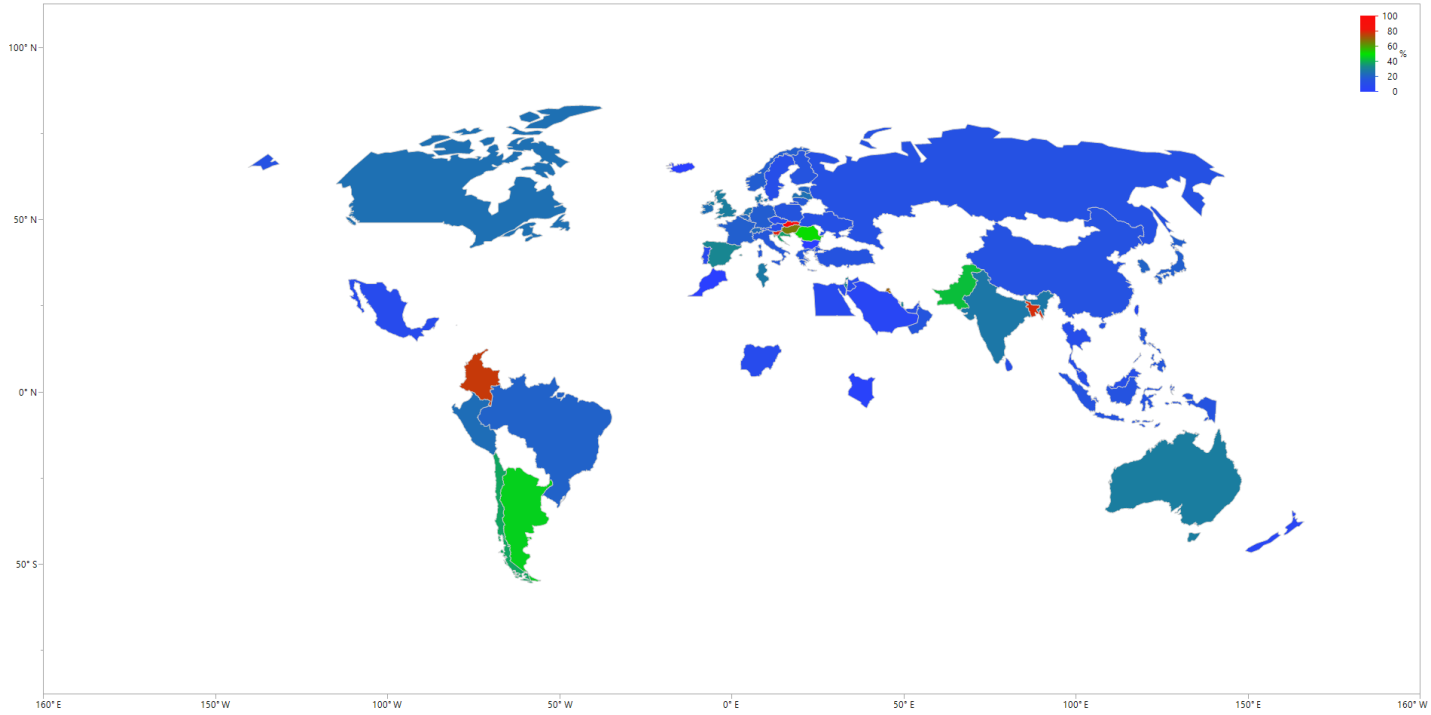


Figure 2: Advantaged foreign ownership: world map
This figure plots the sample average advantaged foreign ownership across 70 countries in the sample. Advantaged foreign ownership is higher in developed countries (common law countries) than in emerging countries (civil law countries).

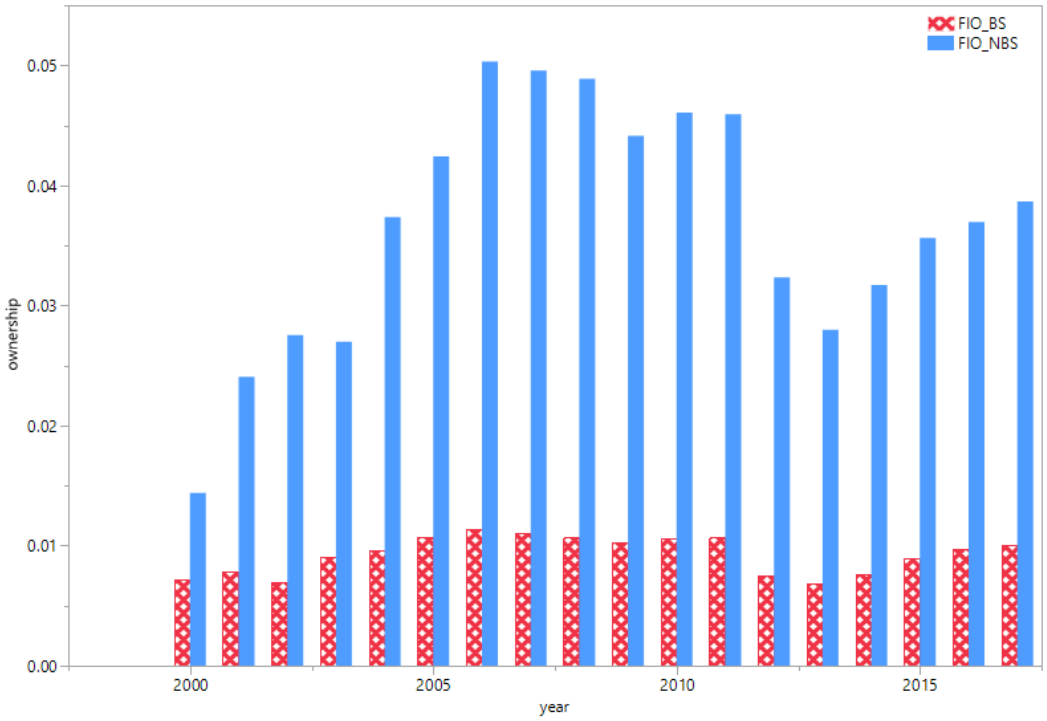


Figure 3: Advantaged foreign ownership by year
This figure shows the time series of the average of advantaged foreign ownership (FIO_A) and remaining foreign ownership (FIO_R) across all firms in the sample from 200 to 2017.

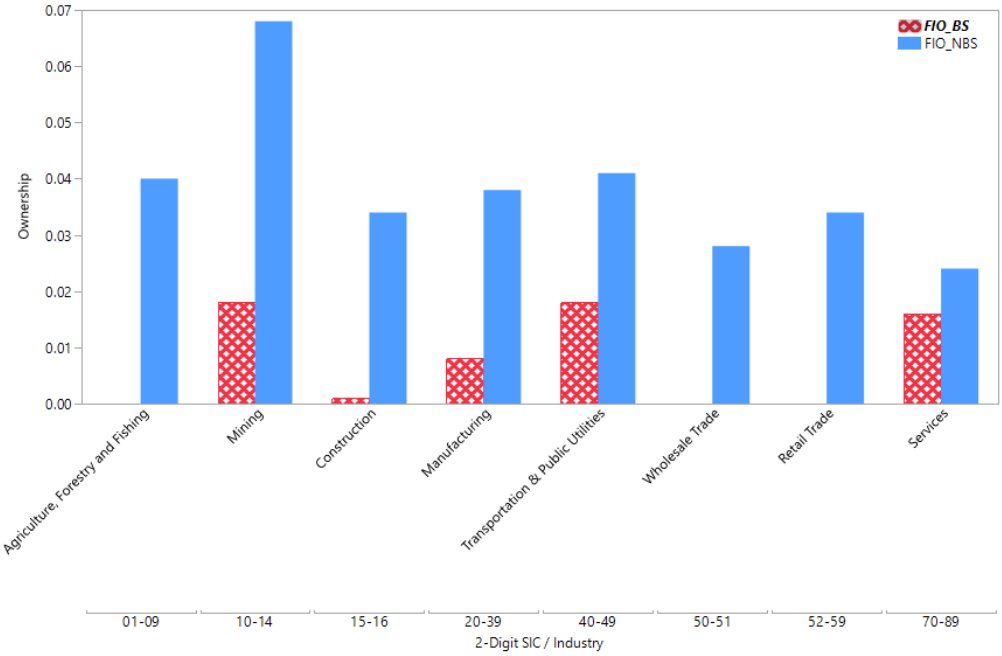


Figure 4: Advantaged foreign ownership by sector
This figure shows the average of advantaged foreign ownership (FIO_A) and remaining foreign ownership (FIO_R) across all firms by sector. The percentage of advantaged ownership on total foreign ownership is the highest in the Service sector and the lowest in Agriculture, Forestry and Fishing sector.

Figure 5: Average advantaged foreign ownership around the passage of JGTRRA
This figure plots the average advantaged foreign ownership (FIO_A) of the treatment group (dark line) and of the control group (dotted line) around the passage of JGTRRA in 2003.

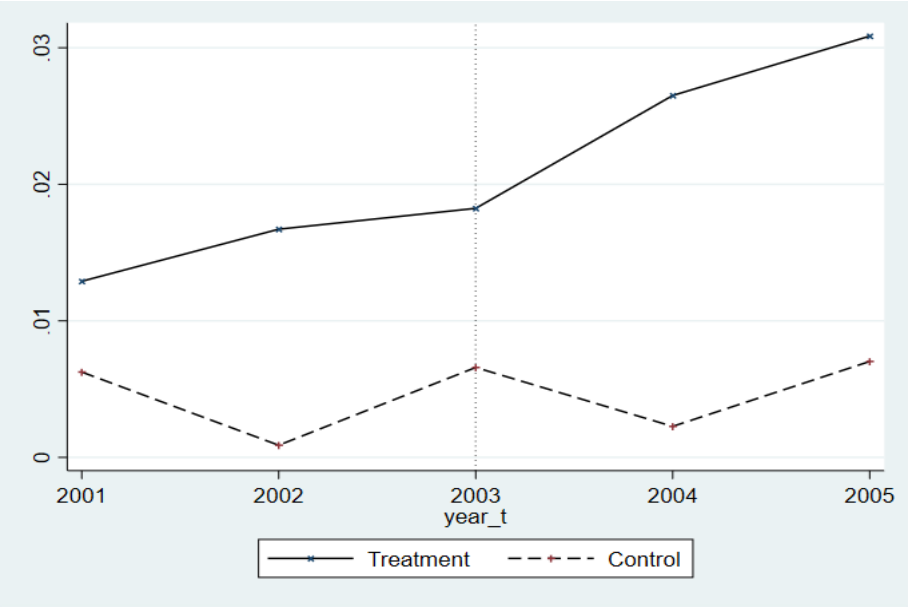
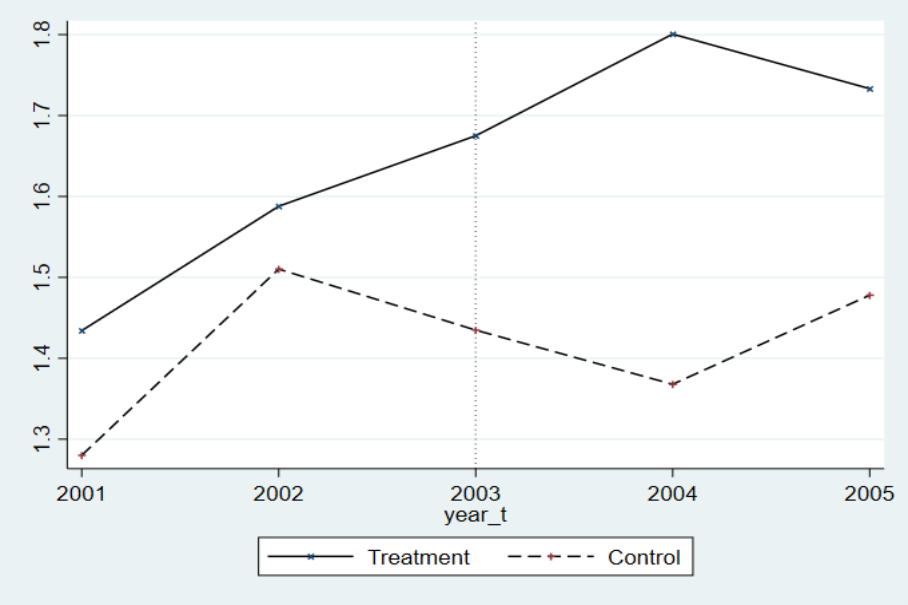


Figure 6: Average Tobin's Q around the passage of JGTRRA
This figure plots the average Tobin's Q of the treatment group (dark line) and of the control group (dotted line) around the passage if JGTRRA in 2003.



2.9 Tables

Table 1: Summary statistics
This table shows the mean, standard deviation, number of observations, minimum, 25 percentile, median, 75 percentile, and maximum for each variable. Variable definitions are provided in Table A.1 in the Appendix. Variables are winsorized at the top and bottom 0.5%.

	Mean	SD	N	MIN	P25	P50	P75	MAX
Panel A: Institutional ownership variable								
FIO	0.046	0.077	82646	0.000	0.000	0.011	0.059	0.992
FIO_A	0.009	0.034	82646	0.000	0.000	0.000	0.002	0.942
FIO_R	0.037	0.067	82646	0.000	0.000	0.007	0.043	0.963
DIO	0.040	0.074	82646	0.000	0.000	0.012	0.047	0.797
FIO_INDP_A	0.009	0.034	82646	0.000	0.000	0.000	0.001	0.928
FIO_INDP_R	0.033	0.063	82646	0.000	0.000	0.005	0.037	0.963
FIO_gray	0.004	0.009	82646	0.000	0.000	0.000	0.004	0.385
FIO_LT_A	0.009	0.034	82646	0.000	0.000	0.000	0.002	0.850
FIO_LT_R	0.036	0.066	82646	0.000	0.000	0.007	0.042	0.960
FIO_ST	0.001	0.004	82646	0.000	0.000	0.000	0.000	0.523
FIO_HI_A	0.009	0.034	82646	0.000	0.000	0.000	0.002	0.942
FIO_HI_R	0.036	0.067	82646	0.000	0.000	0.007	0.042	0.963
FIO_LI	0.000	0.003	82646	0.000	0.000	0.000	0.000	0.194
FIO_LS_A	0.008	0.032	82646	0.000	0.000	0.000	0.000	0.942
FIO_LS_R	0.020	0.047	82646	0.000	0.000	0.000	0.019	0.963
FIO_SS	0.018	0.038	82646	0.000	0.000	0.002	0.020	0.811
Panel B: dependent variables								
Q	1.703	1.483	82646	0.383	0.948	1.235	1.829	13.292
Patent	8.789	103.364	82646	0.000	0.000	0.000	0.000	7548
TFP	-0.049	0.386	67787	-8.556	-0.195	-0.031	0.116	4.562
SALE	12.667	1.984	82555	0.693	11.506	12.665	13.926	16.588
Buyback	0.005	0.093	79797	0.000	0.000	0.000	0.000	24.359
DIV_payout	25.812	25.429	75030	0.000	0.000	21.290	40.340	100
Panel C: Firm-level control variables								
SIZE	12.909	1.803	82646	5.478	11.727	12.834	14.047	16.836
SGROWTH	0.103	0.353	82646	-0.836	-0.039	0.047	0.158	3.379
LEV	0.205	0.182	82646	0.000	0.043	0.176	0.324	1.224
CASH	0.183	0.161	82646	0.000	0.069	0.136	0.246	0.890
CAPEX	0.047	0.047	82646	0.000	0.016	0.033	0.063	0.398
ROA	0.053	0.152	82646	-1.613	0.036	0.069	0.106	0.359
R&D	0.030	0.060	82646	0.000	0.002	0.012	0.032	0.591
PPE	0.280	0.183	82646	0.000	0.135	0.260	0.402	0.937
FXSALE	0.327	0.340	82646	0.000	0.000	0.208	0.605	1.000
ANALYST	3.368	5.119	82646	0.000	0.000	1.222	4.250	53.083
CLOSE	0.424	0.234	82646	0.000	0.246	0.425	0.604	0.977
ADR	0.063	0.243	82646	0.000	0.000	0.000	0.000	1.000
Panel D: Instrumental variables								
FTSE	0.140	0.347	82646	0.000	0.000	0.000	0.000	1.000
AUDIT	116.451	28.070	82619	13	100	128	138	152

Table 2: Supsample average of advantaged (remaining) foreign ownership
This table shows mean, standard deviation and number of observations for advantaged and remaining foreign ownership, classified by industry, developed vs. emerging and civil law vs. common law countries.

Industry / Country	N	FIO_A		FIO_R		FIO_A/FIO
		Mean	SD	Mean	SD	
Panel A: Industries						
Agriculture, Forestry and Fishing	645	0.000	0.000	0.040	0.066	0.09%
Mining	1963	0.018	0.046	0.068	0.112	20.95%
Construction	3421	0.001	0.008	0.034	0.055	3.78%
Manufacturing	58996	0.008	0.032	0.038	0.068	17.60%
Transportation, Communications, Elec.	3378	0.018	0.036	0.041	0.067	29.93%
Wholesale Trade	2216	0.000	0.002	0.028	0.047	1.12%
Retail Trade	1472	0.000	0.001	0.034	0.062	0.20%
Services	10551	0.016	0.051	0.024	0.055	40.11%
Panel B: Countries						
Developped countries	51015	0.012	0.041	0.046	0.074	21.26%
Emerging countries	31457	0.004	0.018	0.023	0.051	14.94%
Civil Law Countries	60123	0.008	0.029	0.038	0.065	17.88%
Common Law Countries	22456	0.012	0.046	0.035	0.072	25.04%

Table 3: Advantaged foreign ownership and firm value: Univariate tests
This table presents average next period Tobin's Q grouped by tertiles of advantaged foreign ownership (the firm industry is one of the TOP 3 industries in the institutional investor's country) and remaining foreign ownership. The first (T1), second (T2), and third (T3) tertiles represent groups with the lowest, medium, and highest values of the corresponding variable, respectively. The sample period is from 2000 to 2017. The tertiles are sorted at each year. The last row reports the differences of sample mean between the highest and the lowest tertiles and their corresponding t-statistic. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

FIO_A	All sample		FIO_R	All sample	
	Mean	STD		Mean	STD
T1 (Low)	1.686	1.516	T1 (Low)	1.840	1.667
T2	1.682	1.281	T2	1.512	1.290
T3 (High)	1.820	1.477	T3 (High)	1.614	1.211
	Diff	t-stats		Diff	t-stats
T3-T1 (High-Low)	0.134***	8.62	T3-T1 (High-Low)	-0.226***	-19.24

Table 4: Advantaged foreign ownership and firm value: Multivariate tests
This table shows the results of multivariate regressions using different measures of advantaged and remaining foreign ownership. The dependent variable is firm's Tobin's Q. Column (1) and (2) use dummy variables indicating the tertiles of advantaged foreign ownership, remaining ownership and domestic ownership. Column (3) and (4) use the ordinal variable from 1 to 3, lowest to highest tertiles of advantaged foreign ownership, remaining ownership and domestic ownership. Column (5) and (6) use the advantaged foreign ownership, remaining ownership and domestic ownership (percentage), scaled by variable's standard deviation (dependent variable also scaled by its standard deviation). All independent variables are lagged by one year. Standard errors are clustered at the firm level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

		(1)	(2)	(3)	(4)	(5)	(6)
		Q_{t+1}	Q_{t+1}	Q_{t+1}	Q_{t+1}	Q_{t+1}	Q_{t+1}
		Tertile dummy		Ordinal		Percentage	
FIO_A	T2	0.016	0.075***	0.059***	0.086***	0.032***	0.041***
		(0.80)	(4.58)	(4.24)	(6.60)	(4.60)	(4.98)
	T3	0.152***	0.175***				
		(5.29)	(6.47)				
FIO_R	T2	-0.223***	0.029*	-0.098***	0.015	0.010	0.027***
		(-11.54)	(1.79)	(-7.35)	(1.24)	(1.32)	(3.51)
	T3	-0.165***	0.028				
		(-6.16)	(1.17)				
DIO	T2	0.188***	-0.011	0.153***	0.002	0.050***	0.011
		(10.29)	(-0.79)	(12.86)	(0.21)	(7.78)	(1.31)
	T3	0.303***	0.006				
		(12.61)	(0.27)				
SIZE		-0.197***	-0.519***	-0.198***	-0.519***	-0.137***	-0.351***
		(-22.34)	(-17.83)	(-23.11)	(-17.88)	(-25.67)	(-17.98)
SGROWTH		0.317***	0.151***	0.320***	0.151***	0.223***	0.101***
		(13.18)	(6.16)	(13.32)	(6.15)	(13.70)	(6.11)
LEV		0.320***	0.249**	0.331***	0.250**	0.225***	0.167**
		(4.65)	(2.40)	(4.82)	(2.40)	(4.93)	(2.38)
CASH		1.428***	0.977***	1.432***	0.977***	0.939***	0.656***
		(16.05)	(9.35)	(16.09)	(9.34)	(15.54)	(9.29)
CAPEX		3.120***	0.630***	3.138***	0.631***	2.180***	0.424***
		(16.38)	(3.95)	(16.44)	(3.96)	(16.88)	(3.94)
ROA		0.022	-0.006	0.022	-0.007	0.020	-0.004
		(0.15)	(-0.05)	(0.15)	(-0.05)	(0.20)	(-0.04)
R&D		4.038***	1.465***	4.011***	1.463***	2.770***	0.983***
		(11.38)	(3.33)	(11.31)	(3.33)	(11.62)	(3.32)
PPE		-0.592***	-0.197*	-0.595***	-0.197*	-0.435***	-0.134*
		(-10.57)	(-1.81)	(-10.59)	(-1.82)	(-11.45)	(-1.83)
FXSALE		-0.262***	-0.133***	-0.262***	-0.133***	-0.214***	-0.094***
		(-8.52)	(-3.17)	(-8.50)	(-3.17)	(-10.33)	(-3.31)
ANALYST		0.052***	0.012***	0.053***	0.012***	0.035***	0.008***
		(18.44)	(3.88)	(19.09)	(3.86)	(18.10)	(3.55)
CLOSE		0.199***	0.128**	0.193***	0.128**	0.147***	0.102***
		(4.21)	(2.53)	(4.07)	(2.54)	(4.74)	(2.98)
ADR		0.389***	0.000	0.411***	0.000	0.261***	0.000
		(8.87)	(.)	(9.29)	(.)	(8.90)	(.)
Year FE		Y	Y	Y	Y	Y	Y
Firm FE		N	Y	N	Y	N	Y
N		82646	82646	82646	81415	81415	81415
adj. R-sq		0.227	0.688	0.221	0.688	0.221	0.688

Table 5: Advantaged foreign ownership and firm value: long-term effect

This table reports the results of multivariate regressions for longer period, up to 5 years ahead. Column (1), (4), (7) and (10) use the dummy variables indicating the tertiles of advantaged and remaining foreign ownership. Column (2), (5), (8) and (11) use the ordinal variable from 1 to 3, lowest to highest tertiles of advantaged and remaining foreign ownership. Column (3), (6), (9) and (12) use the advantaged and remaining foreign ownership (percentage), scaled by variable's standard deviation (dependent variable also scaled by its standard deviation). Standard errors are clustered at the firm level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		Q_t+2			Q_t+3			Q_t+4			Q_t+5		
FIO_A	T2	0.035**	0.051***	0.023***	0.038**	0.038***	0.014*	0.003	0.009	0.006	0.007	0.000	-0.002
		(2.11)	(3.70)	(2.87)	(2.16)	(2.77)	(1.86)	(0.17)	(0.61)	(0.82)	(0.35)	(0.01)	(-0.23)
	T3	0.108***			0.075***			0.019			-0.001		
		(3.77)			(2.68)			(0.67)			(-0.05)		
FIO_R	T2	0.030*	0.007	0.014**	0.022	0.004	0.001	-0.020	-0.020	-0.017*	-0.033*	-0.031**	-0.030***
		(1.84)	(0.55)	(2.00)	(1.30)	(0.31)	(0.14)	(-1.05)	(-1.32)	(-1.93)	(-1.71)	(-1.99)	(-3.13)
	T3	0.012			0.008			-0.038			-0.059*		
		(0.50)			(0.28)			(-1.26)			(-1.89)		
DIO	T2	-0.072***	-0.034***	0.011	-0.051***	-0.018	0.008	-0.017	-0.002	-0.004	-0.023	-0.003	-0.002
		(-4.85)	(-2.94)	(1.23)	(-3.26)	(-1.47)	(0.88)	(-1.01)	(-0.18)	(-0.41)	(-1.27)	(-0.18)	(-0.19)
	T3	-0.065***			-0.032			-0.002			-0.000		
		(-2.75)			(-1.28)			(-0.07)			(-0.01)		
Controls		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FE		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
N		68329	68329	68329	56664	56664	56664	46431	46431	46431	37240	37240	37240
adj. R-sq		0.696	0.696	0.696	0.706	0.706	0.706	0.713	0.713	0.713	0.724	0.724	0.724

Table 6: 2SLS with instrumental variables: Ordinal variables
This table represents the 2SLS regressions of firm value (Tobin's Q) on advantaged and remaining foreign ownership, using FTSE index membership (*FTSE*) and firm country's auditing quality (*Rank_IND_SIZE*) as instrumental variables. The *FIO_A*, *FIO_R*, *DIO* are ordinal variables, from 1 to 3, lowest to highest tertiles of advantaged ownership, remaining ownership and domestic ownership. All independent variables are lagged by one year. Standard errors are clustered at the firm level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
	First stage	2SLS	First stage		2SLS
	FIO_A	Q_t+1	FIO_A	FIO_R	Q_t+1
FTSE	0.091***		0.092***	0.058***	
	(4.75)		(4.78)	(2.94)	
AUDIT			-0.001	0.005***	
			(-0.77)	(3.07)	
FIO_A		2.573***			5.363***
		(3.68)			(3.14)
FIO_R	0.028***	-0.056**			-4.662**
	(4.48)	(-2.02)			(-2.50)
DIO	0.045***	-0.107***	0.047***	0.093***	0.190
	(9.15)	(-2.94)	(9.65)	(17.03)	(1.25)
SIZE	0.099***	-0.776***	0.101***	0.118***	-0.535***
	(12.02)	(-9.96)	(12.33)	(13.19)	(-2.68)
SGROWTH	-0.012*	0.183***	-0.012*	-0.012	0.164***
	(-1.76)	(5.92)	(-1.80)	(-1.58)	(2.92)
LEV	-0.149***	0.622***	-0.155***	-0.256***	-0.111
	(-5.46)	(4.05)	(-5.67)	(-8.66)	(-0.25)
CASH	0.070**	0.804***	0.075**	0.214***	1.576***
	(2.22)	(6.03)	(2.41)	(5.88)	(3.67)
CAPEX	0.247***	-0.006	0.255***	0.336***	0.802
	(4.09)	(-0.02)	(4.20)	(5.03)	(1.15)
ROA	-0.001	-0.001	-0.003	-0.055**	-0.237
	(-0.06)	(-0.01)	(-0.11)	(-2.17)	(-1.03)
R&D	-0.093	1.668***	-0.087	0.323***	3.337***
	(-0.96)	(3.57)	(-0.89)	(3.28)	(3.35)
PPE	0.027	-0.263*	0.030	0.080*	0.041
	(0.68)	(-1.80)	(0.76)	(1.79)	(0.12)
FXSALE	-0.005	-0.120**	-0.002	0.101***	0.360
	(-0.31)	(-1.98)	(-0.12)	(5.22)	(1.56)
ANALYST	0.013***	-0.022**	0.013***	0.015***	0.011
	(10.63)	(-2.26)	(10.94)	(12.06)	(0.40)
CLOSE	-0.083***	0.335***	-0.091***	-0.259***	-0.612
	(-3.70)	(3.46)	(-4.02)	(-10.78)	(-1.39)
ADR	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)
SW F-stats	*22.60*		*13.18*	*11.35*	
p-value	*(0.00)*		*(0.00)*	*(0.00)*	
Year FE	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y
N	81410	81410	81400	81400	81400
adj. R-sq	0.724		0.724	0.765	

Table 7: 2SLS with instrumental variables: Percentage
This table represents the 2SLS regressions of firm value (Tobin's Q) on advantaged and remaining foreign ownership, using FTSE index membership ($FTSE$) and firm country's auditing quality ($Rank\_IND\_SIZE$) as instrumental variables. The FIO_A, FIO_R, DIO are advantaged foreign ownership, remaining ownership and domestic ownership (percentage), scaled by variable'standard deviation (dependent variable also scaled by its standard deviation). All independent variables are lagged by one year. Standard errors are clustered at the firm level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
	First stage	2SLS	First stage		2SLS
	FIO_A	Q_t+1	FIO_A	FIO_R	Q_t+1
FTSE	0.182***		0.158***	0.207***	
	(5.04)		(4.51)	(5.66)	
AUDIT			0.001**	0.001***	
			(2.00)	(3.92)	
FIO_A		1.268***			3.359***
		(3.97)			(3.47)
FIO_R	-0.117***	0.177***			-1.808***
	(-5.86)	(4.66)			(-2.68)
DIO	-0.010	0.030	-0.007	-0.020	0.001
	(-0.74)	(1.56)	(-0.55)	(-1.47)	(0.01)
SIZE	0.110***	-0.664***	0.096***	0.124***	-0.446***
	(7.93)	(-13.93)	(7.30)	(9.34)	(-4.40)
SGROWTH	0.001	0.152***	-0.001	0.014	0.128***
	(0.05)	(5.22)	(-0.06)	(1.58)	(2.61)
LEV	-0.115***	0.390***	-0.088**	-0.251***	-0.017
	(-2.79)	(3.26)	(-2.17)	(-5.93)	(-0.07)
CASH	0.099*	0.855***	0.066	0.286***	0.967***
	(1.82)	(6.89)	(1.21)	(6.36)	(3.54)
CAPEX	0.278**	0.272	0.249**	0.313***	0.207
	(2.24)	(1.14)	(2.01)	(4.02)	(0.42)
ROA	-0.040	0.045	-0.037	-0.030	0.080
	(-1.15)	(0.34)	(-1.06)	(-1.03)	(0.51)
R&D	-0.067	1.514***	-0.093	0.221	1.670**
	(-0.34)	(3.20)	(-0.48)	(1.55)	(2.16)
PPE	0.069	-0.281**	0.056	0.106*	-0.128
	(1.16)	(-2.09)	(0.95)	(1.86)	(-0.53)
FXSALE	0.043*	-0.189***	0.030	0.119***	0.039
	(1.67)	(-3.53)	(1.18)	(4.88)	(0.30)
ANALYST	0.015***	-0.009	0.011***	0.032***	0.027
	(5.13)	(-1.41)	(4.19)	(13.67)	(1.27)
CLOSE	-0.241***	0.440***	-0.181***	-0.516***	-0.257
	(-6.60)	(4.39)	(-5.20)	(-13.07)	(-0.78)
ADR	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)
SW F-stats	*25.45*		*13.18*	*11.35*	
p-value	*(0.00)*		*(0.00)*	*(0.00)*	
Year FE	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y
N	81410	81410	81383	81383	81383
adj. R-sq	0.754		0.751	0.788	

Table 8: Adding the lagged Tobin's Q
This table represents the OLS and 2SLS regressions of firm value (Tobin's Q) on advantaged and remaining foreign ownership, adding the lagged Tobin's Q. The instrumental variables are FTSE index membership and firm country's auditing quality. The *FIO_A*, *FIO_R*, *DIO* are ordinal variables, from 1 to 3, lowest to highest tertiles of ownership, remaining ownership and domestic ownership. All independent variables are lagged by one year. Standard errors are clustered at the firm level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	First stage	2SLS	First stage		2SLS
	Q_t+1	IO_FOR_A	Q_t+1	IO_FOR_A	IO_FOR_R	Q_t+1
FTSE		0.069***		0.069***	0.024	
		(3.53)		(3.51)	(1.14)	
AUDIT				-0.000	0.001***	
				(-1.05)	(3.89)	
FIO_A	0.044***		1.605***			2.210**
	(4.18)		(2.58)			(2.56)
FIO_R	0.002	0.017**	-0.025			-1.958***
	(0.23)	(2.57)	(-1.41)			(-2.82)
DIO	-0.034***	0.039***	-0.094***	0.041***	0.088***	0.052
	(-3.45)	(7.35)	(-3.31)	(7.64)	(14.52)	(0.70)
Q	0.417***	0.023***	0.380***	0.023***	0.011***	0.383***
	(28.57)	(8.10)	(18.34)	(8.02)	(3.39)	(14.13)
SIZE	-0.273***	0.114***	-0.457***	0.117***	0.117***	-0.295**
	(-10.80)	(11.49)	(-5.85)	(11.76)	(11.04)	(-2.16)
SGROWTH	0.026	-0.024***	0.065**	-0.024***	-0.010	0.060
	(1.04)	(-2.92)	(2.06)	(-2.90)	(-1.18)	(1.46)
LEV	0.091	-0.161***	0.344**	-0.168***	-0.248***	-0.054
	(0.99)	(-5.46)	(2.50)	(-5.67)	(-7.59)	(-0.21)
CASH	0.477***	0.065*	0.377***	0.069**	0.191***	0.714***
	(5.23)	(1.86)	(3.37)	(1.98)	(4.59)	(3.49)
CAPEX	-0.189	0.202***	-0.516**	0.212***	0.306***	-0.015
	(-1.28)	(2.93)	(-2.30)	(3.06)	(3.90)	(-0.04)
ROA	-0.218*	0.003	-0.221*	0.002	-0.050*	-0.314**
	(-1.93)	(0.11)	(-1.81)	(0.07)	(-1.84)	(-2.21)
R&D	0.192	-0.079	0.304	-0.073	0.219**	0.767
	(0.50)	(-0.73)	(0.76)	(-0.68)	(2.04)	(1.56)
PPE	0.131	0.029	0.084	0.032	0.090*	0.245
	(1.40)	(0.66)	(0.72)	(0.73)	(1.79)	(1.40)
FXSALE	-0.074**	0.000	-0.074	0.003	0.106***	0.135
	(-2.11)	(0.03)	(-1.60)	(0.16)	(4.92)	(1.36)
ANALYST	0.003	0.010***	-0.014**	0.010***	0.012***	0.003
	(1.45)	(7.88)	(-2.09)	(7.97)	(9.47)	(0.23)
CLOSE	0.074*	-0.087***	0.210***	-0.092***	-0.256***	-0.241
	(1.73)	(-3.53)	(2.65)	(-3.72)	(-9.68)	(-1.13)
ADR	0.000	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)	(.)
SW F-stats		12.48		15.320	16.572	
p-value		*(0.00)*		*(0.00)*	*(0.00)*	
Year FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
N	68329	68329	68329	68308	68308	68308
adj. R-sq	0.755	0.751		0.751	0.779	

Table 9: Comparison of firm characteristics after matching
This table presents the comparison of the group mean of both treated and control group after propensity score matching. The treatment firms are firms located in the U.S. tax treaty countries and paid dividend in 2001. The sample firms is then restricted to the industries which are Top 3 industries of U.S. from 2001 to 2005. The controls group consists of firms located in the U.S. non tax treaty countries and paid dividend in 2002.

Variable	Treated	Control	Difference	t-stats	p-value
FIO_A	0.006	0.009	-0.002	-0.73	0.46
SIZE	12.465	12.309	0.156	0.68	0.50
LEV	0.169	0.148	0.021	1.10	0.27
CAPEX	0.055	0.060	-0.005	-0.88	0.38
ROA	0.077	0.077	0.000	0.04	0.97
Q_t+1	1.296	1.278	0.018	0.16	0.87

Table 10: DiD: Univariate tests
This table represents the univariate test results of DiD tests using the passage of JGTRRA of 2003 in U.S. as a quasi-natural experiment. The treatment firms are firms located in the U.S. tax treaty countries and paid dividend in 2001. The sample firms is then restricted to the industries which are Top 3 industries of U.S. from 2001 to 2005. The controls group consists of firms located in the U.S. non tax treaty countries and paid dividend in 2002. The DiD approach compares the firm value of treatment group and control group 2 years before the event (2001 - 2002) and 2 years after the event (2004 - 2005). ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Panel A: t test: pre-event test (2001-2002)				
	Treated	Control	Difference	t-stats
Q_t+1	1.466	1.393	0.072	0.75
Panel B: t test: post-event test (2004-2005)				
	Treated	Control	Difference	t-stats
Q_t+1	1.737	1.427	0.310***	3.16
Panel C: Univariate test: DiD				
	Treated Post - Pre	Control Post - Pre	Dif-in-Dif	t-stats
Q_t+1	0.271	0.033	0.238***	3.92

Table 11: DiD: Multivariate tests
This table represents the regression results of DiD tests using the passage of JGTRRA of 2003 in U.S. as a quasi-natural experiment. The treatment firms are firms located in the U.S. tax treaty countries and paid dividend in 2001. The sample firms is then restricted to the industries which are Top 3 industries of U.S. from 2001 to 2005. The controls group consists of firms located in the U.S. non tax treaty countries and paid dividend in 2002. The DiD approach compares the firm value of treatment group and control group 2 years before the event (2001 - 2002) and 2 years after the event (2004 - 2005). *TREAT* is a dummy variable that equals 1 if the firm is in the treatment group and 0 if the firm is in the control group. *POST* is a dummy variable that equals 1 if it is after 2003 and 0 if it is before 2003. All independent variables are lagged by one year. Standard errors are clustered at the firm level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	FIO_A	FIO_A	FIO_R	FIO_R	Q_t+1	Q_t+1
Treat*Post	0.012***	0.011***	-0.027***	-0.030***	0.297***	0.272***
	(3.88)	(2.69)	(-4.14)	(-4.14)	(3.12)	(2.98)
FIO_A				-0.078		
				(-0.46)		
FIO_R		-0.034				-0.849
		(-0.45)				(-0.93)
DIO		0.040		0.284		1.535*
		(1.07)		(1.43)		(1.91)
SIZE		0.009*		0.015***		-0.152
		(1.66)		(2.69)		(-1.09)
SGROWTH		-0.003		-0.027***		0.135
		(-0.50)		(-3.00)		(0.69)
LEV		0.016		-0.005		-0.063
		(1.03)		(-0.26)		(-0.10)
CASH		-0.005		0.006		0.694
		(-0.39)		(0.21)		(1.36)
CAPEX		-0.000		-0.015		1.671
		(-0.02)		(-0.42)		(1.18)
ROA		-0.011		-0.010		-1.014
		(-1.12)		(-0.68)		(-0.95)
R&D		-0.007		0.012		2.730
		(-0.18)		(0.29)		(1.44)
PPE		0.031		-0.008		-1.281*
		(1.16)		(-0.29)		(-1.78)
FXSALE		-0.003		0.020		-0.386
		(-0.22)		(0.90)		(-1.31)
ANALYST		-0.000		0.001		-0.009
		(-0.55)		(1.21)		(-0.77)
CLOSE		0.008		-0.010		0.141
		(0.53)		(-0.39)		(0.56)
ADR		0.000		0.000		0.000
		(.)		(.)		(.)
Year FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
N	884	884	884	884	884	884
adj. R-sq	0.771	0.776	0.736	0.767	0.827	0.741

Table 12: Monitoring channel: Independent and long-term advantaged foreign investors
This table represents the results on how the advantaged foreign investors improve firm value through monitoring channel. Foreign ownership are classified into independent and gray foreign ownership or into long-term and short-term ownership. Independent (long-term) foreign ownership are decomposed into advantaged ($FIO\_\boldsymbol{X}\_A$) and remaining ($FIO\_\boldsymbol{X}\_R$) foreign ownership. The dependent variable is firm value measured by Tobin's Q (Q_{t+1}). $FIO\_\boldsymbol{X}$, $FIO\_\boldsymbol{X}\_A$, $FIO\_\boldsymbol{X}\_R$ and $FIO\_N\boldsymbol{X}$ are ordinal variables, from 1 to 3, lowest to highest tertiles of independent (long-term) foreign ownership, independent (long-term) advantaged foreign ownership, independent (long-term) remaining foreign ownership and gray (short-term) foreign ownership. The instrumental variables are FTSE index membership and firm country's auditing quality, for $FIO\_\boldsymbol{X}\_A$ and $FIO\_\boldsymbol{X}\_R$. All independent variables are lagged by one year. Standard errors are clustered at the firm level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	$\boldsymbol{X}$=Independent			$\boldsymbol{X}$=Long-term		
	OLS	OLS	2SLS	OLS	OLS	2SLS
FIO_$\boldsymbol{X}$	0.050***			0.037***		
	(4.11)			(2.97)		
FIO_$\boldsymbol{X}$_A		0.084***	5.370**		0.086***	5.202***
		(6.43)	(2.40)		(6.38)	(3.44)
FIO_$\boldsymbol{X}$_R		0.023**	-4.902***		0.013	-3.748***
		(2.04)	(-3.31)		(1.07)	(-3.75)
FIO_N$\boldsymbol{X}$	-0.006	-0.007	0.292	0.034***	0.032***	0.120
	(-0.52)	(-0.64)	(1.24)	(5.80)	(5.47)	(1.16)
DIO	0.004	0.003	0.187	0.000	-0.001	0.091
	(0.31)	(0.22)	(1.27)	(0.02)	(-0.09)	(1.03)
SIZE	-0.514***	-0.520***	-0.584**	-0.518***	-0.523***	-0.615***
	(-17.68)	(-17.82)	(-2.16)	(-17.84)	(-18.00)	(-3.91)
SGROWTH	0.150***	0.151***	0.154**	0.148***	0.149***	0.158***
	(6.11)	(6.14)	(2.56)	(6.04)	(6.09)	(2.80)
LEV	0.247**	0.251**	-0.172	0.255**	0.259**	0.072
	(2.36)	(2.41)	(-0.33)	(2.45)	(2.49)	(0.23)
CASH	0.974***	0.975***	1.548***	0.969***	0.970***	1.416***
	(9.29)	(9.32)	(3.57)	(9.25)	(9.28)	(4.75)
CAPEX	0.635***	0.626***	0.902	0.610***	0.603***	0.406
	(3.99)	(3.93)	(1.01)	(3.83)	(3.78)	(0.81)
ROA	-0.004	-0.007	-0.167	-0.008	-0.010	-0.216
	(-0.03)	(-0.05)	(-0.75)	(-0.06)	(-0.08)	(-1.06)
R&D	1.450***	1.461***	3.275***	1.451***	1.462***	3.237***
	(3.29)	(3.32)	(3.67)	(3.30)	(3.34)	(4.05)
PPE	-0.197*	-0.197*	0.084	-0.193*	-0.195*	-0.003
	(-1.81)	(-1.82)	(0.25)	(-1.77)	(-1.79)	(-0.01)
FXSALE	-0.136***	-0.134***	0.374*	-0.136***	-0.133***	0.278*
	(-3.24)	(-3.20)	(1.86)	(-3.23)	(-3.17)	(1.79)
ANALYST	0.013***	0.012***	0.014	0.012***	0.011***	-0.001
	(4.02)	(3.87)	(0.44)	(3.80)	(3.62)	(-0.06)
CLOSE	0.130**	0.128**	-0.652*	0.136***	0.136***	-0.398
	(2.57)	(2.54)	(-1.67)	(2.70)	(2.69)	(-1.47)
ADR	0.000	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)	(.)
Year FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
N	81410	81410	81383	81410	81410	81383
adj. R-sq	0.688	0.688		0.688	0.689	

Table 13: Monitoring channel: Interaction with liquidity and ownership concentration
This table shows the results of regressions with interaction terms between advantaged foreign ownership and related variables: two liquidity measures (Amihud illiquidity measure: Column 1 and 2; number of zero return days divided by total trading days: Column 3 and 4) and two ownership concentration measures (number of institutions holding the firms: Column 5 and 6; HHI of institutional ownership: Column 7 and 8). The dependent variable is firm value measured by Tobin's Q. All independent variables are lagged by one year. Standard errors are clustered at the firm level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	X=Amihud		X=Zret		X=N_institution		X=IO_HHI	
FIO_A	0.086***	0.062***	0.086***	0.126***	0.078***	0.102***	0.086***	0.080***
	(6.73)	(2.82)	(6.37)	(7.95)	(5.83)	(6.53)	(6.62)	(6.01)
X	-0.021***	-0.020***	-0.428***	-0.389***	0.001***	0.001***	-3.565***	-4.444***
	(-5.46)	(-4.70)	(-10.46)	(-9.26)	(3.37)	(5.23)	(-3.46)	(-3.71)
X*FIO_A		-0.004		-0.262***		-0.043***		1.293*
		(-1.44)		(-4.56)		(-3.44)		(1.71)
FIO_R	0.019	0.019	0.012	0.011	0.009	0.006	0.018	0.018
	(1.54)	(1.56)	(0.97)	(0.89)	(0.78)	(0.49)	(1.46)	(1.49)
DIO	0.010	0.010	0.008	0.008	0.138	0.123	0.434**	0.462***
	(0.89)	(0.89)	(0.66)	(0.66)	(0.86)	(0.76)	(2.49)	(2.64)
SIZE	-0.511***	-0.510***	-0.518***	-0.518***	-0.528***	-0.532***	-0.521***	-0.521***
	(-16.24)	(-16.19)	(-15.98)	(-15.99)	(-18.20)	(-18.20)	(-17.93)	(-17.93)
SGROWTH	0.141***	0.141***	0.142***	0.140***	0.151***	0.151***	0.149***	0.149***
	(5.53)	(5.53)	(5.19)	(5.12)	(6.16)	(6.16)	(6.11)	(6.10)
LEV	0.191*	0.189*	0.222*	0.219*	0.251**	0.260**	0.254**	0.254**
	(1.69)	(1.67)	(1.91)	(1.89)	(2.41)	(2.50)	(2.44)	(2.44)
CASH	0.884***	0.884***	0.860***	0.859***	0.968***	0.965***	0.980***	0.981***
	(8.42)	(8.41)	(7.96)	(7.97)	(9.21)	(9.19)	(9.37)	(9.38)
CAPEX	0.447***	0.450***	0.359**	0.353**	0.610***	0.600***	0.616***	0.618***
	(2.73)	(2.75)	(2.11)	(2.08)	(3.82)	(3.77)	(3.88)	(3.89)
ROA	-0.065	-0.066	-0.072	-0.071	-0.009	-0.007	-0.008	-0.007
	(-0.51)	(-0.51)	(-0.55)	(-0.54)	(-0.07)	(-0.06)	(-0.06)	(-0.06)
R&D	1.426***	1.423***	1.444***	1.448***	1.449***	1.443***	1.459***	1.453***
	(2.99)	(2.98)	(2.91)	(2.92)	(3.30)	(3.30)	(3.32)	(3.31)
PPE	-0.159	-0.162	-0.109	-0.107	-0.208*	-0.205*	-0.193*	-0.193*
	(-1.40)	(-1.42)	(-0.95)	(-0.93)	(-1.90)	(-1.88)	(-1.78)	(-1.78)
FXSALE	-0.126***	-0.126***	-0.136***	-0.135***	-0.137***	-0.138***	-0.134***	-0.134***
	(-3.02)	(-3.02)	(-3.13)	(-3.11)	(-3.27)	(-3.31)	(-3.18)	(-3.20)
ANALYST	0.012***	0.012***	0.022***	0.022***	0.010***	0.010***	0.012***	0.012***
	(3.81)	(3.77)	(5.58)	(5.57)	(3.30)	(3.05)	(3.76)	(3.76)
CLOSE	0.173***	0.172***	0.178***	0.179***	0.146***	0.148***	0.135***	0.135***
	(3.45)	(3.44)	(3.48)	(3.50)	(2.90)	(2.92)	(2.69)	(2.69)
ADR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
N	75783	75783	69801	69801	81415	81415	81415	81415
adj. R-sq	0.698	0.698	0.700	0.701	0.689	0.689	0.688	0.688

Table 14: Knowledge spillover channel: advantaged foreign investors from high-knowledge countries
This table represents the results on how the advantaged foreign investors improve firm value through knowledge spillover channel. Foreign ownership are classified based on two measurements of knowledge level of their country of origin: industry level R&D intensity and market capitalization. Foreign investors are identified from higher knowledge level countries if their home country industry level of R&D intensity (market value) is higher than the R&D intensity (market value) of the firm industry. High-knowledge foreign ownership are decomposed into advantaged ($FIO\_\boldsymbol{X}\_A$) and remaining ($FIO\_\boldsymbol{X}\_R$) foreign ownership. The dependent variable is firm value measured by Tobin's Q (Q_t+1). $FIO\_\boldsymbol{X}$, $FIO\_\boldsymbol{X}\_A$, $FIO\_\boldsymbol{X}\_R$ and $FIO\_N\boldsymbol{X}$ are ordinal variables, from 1 to 3, lowest to highest tertiles of high-knowledge foreign ownership, high-knowledge advantaged foreign ownership, high-knowledge remaining foreign ownership and low-knowledge foreign ownership. For 2SLS, the instrumental variables are FTSE index membership and firm country's auditing quality, for $FIO\_\boldsymbol{X}\_A$, and $FIO\_\boldsymbol{X}\_R$. All independent variables are lagged by one year. Standard errors are clustered at the firm level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	$\boldsymbol{X}$=R&D intensity			$\boldsymbol{X}$=Industry MV		
	OLS	OLS	2SLS	OLS	OLS	2SLS
FIO_$\boldsymbol{X}$	0.047***			0.041***		
	(4.74)			(3.42)		
FIO_$\boldsymbol{X}$_A		0.065***	8.625***		0.104***	5.021**
		(5.70)	(2.75)		(6.75)	(2.36)
FIO_$\boldsymbol{X}$_R		0.031***	-5.309**		0.020	-1.980**
		(3.31)	(-2.06)		(1.51)	(-2.15)
FIO_N$\boldsymbol{X}$	0.028**	0.027**	0.364	0.035***	0.032***	-0.049
	(2.36)	(2.27)	(1.38)	(2.97)	(2.72)	(-0.17)
DIO	0.001	0.000	0.168	0.002	0.000	-0.065
	(0.09)	(0.02)	(1.06)	(0.16)	(0.04)	(-0.90)
SIZE	-0.517***	-0.519***	-0.491***	-0.518***	-0.523***	-0.770***
	(-17.81)	(-17.88)	(-3.25)	(-17.83)	(-17.97)	(-3.62)
SGROWTH	0.150***	0.150***	0.124*	0.150***	0.151***	0.183***
	(6.13)	(6.13)	(1.80)	(6.13)	(6.16)	(4.08)
LEV	0.253**	0.259**	0.622*	0.252**	0.255**	0.262
	(2.42)	(2.48)	(1.73)	(2.42)	(2.45)	(0.75)
CASH	0.969***	0.969***	1.686***	0.971***	0.969***	0.976***
	(9.25)	(9.25)	(3.16)	(9.28)	(9.28)	(2.70)
CAPEX	0.619***	0.611***	0.517	0.630***	0.615***	-0.464
	(3.89)	(3.84)	(0.59)	(3.95)	(3.86)	(-0.79)
ROA	-0.003	-0.003	-0.154	-0.004	-0.003	0.054
	(-0.03)	(-0.02)	(-0.59)	(-0.03)	(-0.03)	(0.29)
R&D	1.456***	1.458***	1.036	1.444***	1.455***	2.500***
	(3.31)	(3.32)	(0.97)	(3.28)	(3.32)	(3.91)
PPE	-0.197*	-0.195*	0.007	-0.199*	-0.195*	0.139
	(-1.81)	(-1.80)	(0.02)	(-1.83)	(-1.80)	(0.52)
FXSALE	-0.139***	-0.138***	0.251	-0.139***	-0.134***	0.245*
	(-3.32)	(-3.30)	(0.96)	(-3.32)	(-3.20)	(1.92)
ANALYST	0.012***	0.011***	-0.031	0.012***	0.012***	0.008
	(3.83)	(3.64)	(-1.05)	(3.84)	(3.77)	(0.37)
CLOSE	0.134***	0.135***	-0.378	0.136***	0.135***	-0.067
	(2.66)	(2.67)	(-1.03)	(2.69)	(2.68)	(-0.25)
ADR	0.000	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)	(.)
Year FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
N	81410	81410	81383	81410	81410	81383
adj. R-sq	0.688	0.688		0.688	0.688	

Table 15: Knowledge spillover channel: advantaged foreign investors from developed and common law countries

This table represents the OLS and 2SLS regressions of firm value (Tobin's Q) on advantaged foreign ownership from developed (Column 1 to 3) and common law (Column 4 to 5) countries. In Column (3) and (6), the instrumental variables are FTSE index membership and firm country's auditing quality, for $FIO\_\boldsymbol{X}\_A$ and $FIO\_\boldsymbol{X}\_R$. All independent variables are lagged by one year. Standard errors are clustered at the firm level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	$\boldsymbol{X}$=Developped			$\boldsymbol{X}$=Common Law		
	OLS	OLS	2SLS	OLS	OLS	2SLS
FIO_$\boldsymbol{X}$	0.038***			0.058***		
	(3.01)			(4.79)		
FIO_$\boldsymbol{X}$_A		0.084***	4.961***		0.088***	6.625***
		(6.32)	(3.23)		(4.76)	(3.49)
FIO_$\boldsymbol{X}$_R		0.007	-4.223***		0.019	-3.030
		(0.60)	(-3.96)		(1.63)	(-1.43)
FIO_N$\boldsymbol{X}$	0.059***	0.059***	0.226**	0.016	0.019*	0.140
	(6.61)	(6.55)	(2.31)	(1.58)	(1.86)	(0.31)
DIO	-0.001	-0.001	0.136	0.002	0.003	0.075
	(-0.05)	(-0.12)	(1.46)	(0.15)	(0.22)	(0.48)
SIZE	-0.520***	-0.524***	-0.524***	-0.517***	-0.518***	-0.668***
	(-17.89)	(-18.02)	(-3.26)	(-17.81)	(-17.84)	(-3.08)
SGROWTH	0.149***	0.150***	0.150***	0.150***	0.150***	0.176***
	(6.08)	(6.12)	(2.79)	(6.12)	(6.13)	(3.46)
LEV	0.255**	0.257**	-0.090	0.254**	0.249**	0.021
	(2.44)	(2.47)	(-0.27)	(2.43)	(2.40)	(0.04)
CASH	0.972***	0.973***	1.498***	0.969***	0.974***	1.117**
	(9.29)	(9.32)	(4.72)	(9.25)	(9.31)	(2.13)
CAPEX	0.606***	0.596***	0.196	0.627***	0.628***	0.371
	(3.80)	(3.74)	(0.36)	(3.94)	(3.95)	(0.45)
ROA	-0.008	-0.011	-0.264	-0.003	-0.003	0.147
	(-0.07)	(-0.09)	(-1.27)	(-0.03)	(-0.03)	(0.64)
R&D	1.430***	1.444***	3.134***	1.450***	1.458***	2.835***
	(3.25)	(3.29)	(3.95)	(3.29)	(3.32)	(3.12)
PPE	-0.193*	-0.194*	-0.006	-0.198*	-0.197*	-0.086
	(-1.78)	(-1.79)	(-0.02)	(-1.82)	(-1.81)	(-0.24)
FXSALE	-0.134***	-0.131***	0.388**	-0.139***	-0.134***	0.341
	(-3.20)	(-3.11)	(2.26)	(-3.32)	(-3.19)	(1.41)
ANALYST	0.012***	0.011***	0.014	0.012***	0.013***	0.030
	(3.69)	(3.54)	(0.67)	(3.86)	(3.96)	(1.01)
CLOSE	0.134***	0.133***	-0.426	0.136***	0.129**	-0.381
	(2.65)	(2.63)	(-1.54)	(2.69)	(2.54)	(-0.88)
ADR	0.000	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)	(.)
Year FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
N	81410	81410	81383	81410	81410	81383
adj. R-sq	0.688	0.689		0.688	0.688	

Table 16: Impact on firm actions: R&D investment/M&A/Patent counts
This table represents the results on how advantaged foreign investors bring real effects to firm's actions: R&D investment, M&A costs, and patent counts. The FIO_A, FIO_R, DIO are ordinal variables, from 1 to 3, lowest to highest tertiles of advantaged ownership, remaining ownership and domestic ownership. The control variables in column (1) and (2) are $SIZE$, LEV, $CLOSE$, $FXSALE$, $SALE$, $CAPITAL/LABOR$, Q, FCF, $CASH$, and PPE. The control variables in column (3) and (4) are $SIZE$, BM, ROA, $CASH$, LEV, $SGROWTH$, $CAPEX$, and RET. The control variables in column (5) and (6) are $R\&D$, $CLOSE$, $FXSALE$, $SALE$ and $CAPITAL/LABOR$. For 2SLS, the instrumental variables are FTSE index membership and firm country's auditing quality, for FIO_A and FIO_R. All independent variables are lagged by one year. Standard errors are clustered at the firm level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	R&D/TA$_{t+1}$		M&A$_{t+1}$		Patent$_{t+1}$	
	OLS	2SLS	OLS	2SLS	OLS	2SLS
FIO_A	-0.001	0.032**	-0.016	3.274**	0.004	0.722***
	(-1.40)	(2.11)	(-0.36)	(2.11)	(0.68)	(3.08)
FIO_R	0.000	-0.011	-0.050	-3.631***	0.003	-0.362*
	(0.84)	(-0.76)	(-1.27)	(-2.87)	(0.69)	(-1.74)
IO_DOM	0.001	0.000	0.074**	0.261**	-0.003	-0.006
	(1.52)	(0.11)	(2.15)	(2.09)	(-0.65)	(-0.27)
Controls	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y
N	64624	64603	65835	64885	64885	65817
adj. R-sq	0.816		0.434		0.886	

Table 17: Performance improvement: Productivity/Sales
This table represents the results on how advantaged foreign investors improve firm productivity (total factor productivity) and sales (logarithm of total sales). The FIO_A, FIO_R, DIO are ordinal variables, from 1 to 3, lowest to highest tertiles of advantaged ownership, remaining ownership and domestic ownership. The control variables in column (1) and (2) are $SIZE$, $SGROWTH$, LEV, $CLOSE$, $FXSALE$, $CAPEX$, Q, ROA, $CASH$, $R\&D$, and PPE. The control variables in column (3) and (4) are $SIZE$, LEV, $CASH$, $CAPEX$, ROA, $R\&D$, $CLOSE$, and PPE. For 2SLS, the instrumental variables are FTSE index membership and firm country's auditing quality, for FIO_A and FIO_R. All independent variables are lagged by one year. Standard errors are clustered at the firm level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	TFP_t+1		SALE_t+1	
	OLS	2SLS	OLS	2SLS
FIO_A	0.007*	0.754***	0.012**	0.210*
	(1.94)	(2.58)	(2.32)	(1.66)
FIO_R	0.001	-0.654**	0.004	0.067
	(0.23)	(-2.32)	(0.82)	(0.59)
IO_DOM	-0.006*	0.022	0.030***	0.012
	(-1.77)	(1.02)	(7.42)	(1.16)
Controls	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
N	61882	61871	81324	81324
adj. R-sq	0.578		0.971	

2.10 Appendix

Table A1: Variable definitions

Variable	Definition
Institutional ownership variables	
FIO	Shares owned by foreign institutions divided by total shares outstanding
FIO_A	Shares owned by advantaged foreign institutions divided by total shares outstanding
FIO_R	Shares owned by remaining foreign institutions divided by total shares outstanding
DIO	Shares owned by domestic institutions divided by total shares outstanding
FIO_INDP_A	Shares owned by independent advantaged foreign institutions divided by total shares outstanding
FIO_INDP_R	Shares owned by independent remaining foreign institutions divided by total shares outstanding
FIO_GRAY	Shares owned by gray foreign institutions divided by total shares outstanding
FIO_LT_A	Shares owned by long-term advantaged foreign institutions divided by total shares outstanding
FIO_LT_R	Shares owned by long-term remaining foreign institutions divided by total shares outstanding
FIO_ST	Shares owned by short-term foreign institutions divided by total shares outstanding
FIO_HI_A	Shares owned by advantaged foreign institutions from higher innovative countries divided by total shares outstanding
FIO_HI_R	Shares owned by remaining foreign institution from higher innovative countries divided by total shares outstanding
FIO_LI	Shares owned by foreign institutions from lower innovative countries divided by total shares outstanding
FIO_LS_A	Shares owned by advantaged foreign institutions whose home country industry size is larger than the firm's country industry size divided by total shares outstanding
FIO_LS_R	Shares owned by remaining foreign institutions whose home country industry size is larger than the firm's country industry size divided by total shares outstanding
FIO_SS	Shares owned by foreign institutions whose home country industry size is smaller than the firm's country industry size divided by total shares outstanding
Dependent variables	
Q	Assets (Worldscope item 02999) plus market value of equity (Worldscope item 08001) minus book value of equity (Worldscope item 03501) divided by total assets
Patent	Number of patents
TFP	Total factor productivity
SALE	Logorithem of sales (Worldscope item 01001)
Buyback	Buyback expense (Worldscope item 04751) divided by total equity (Worldscope item 08001)
DIV_payout	Dividend payout ration (Worldscope item 09504)
Control variables	
SIZE	Log of total assets (Worldscope item 02999)
SGROWTH	Two-year geometric average of growth in net sales in USD (Worldscope item 01001)
LEV	LEV Leverage: Total debt (Worldscope item 03255) / Total assets (Worldscope item 02999)
CASH	Cash and short-term investments (Worldscope item 02001) / Total assets (Worldscope item 02999)
CAPEX	Capital expenditures (Worldscope item 04601) / Total assets (Worldscope item 02999)

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ROA	Ratio of net income before extraordinary items (Worldscope item 01551) / Total assets (Worldscope item 02999)
R&D	R&D (Worldscope item 01201) /Total assets (Worldscope item 02999)
PPE	Property, plant, and equipment (Worldscope item 02501) / Total assets (Worldscope item 02999)
FXSALE	International annual net sales (Worldscope item 07101) / net sales (Worldscope item 01001)
ANALYST	Number of analysts covering a firm (IBES)
CLOSE	Number of shares held by insiders / number of shares outstanding
ADR	Dummy variable equals 1 if the firm has ADR (DataStream)
DIV	Dummy variable equals 1 if the firm pays dividend
EPS	Earning per share
Instrumental variables	
FTSE	Dummy variable equals 1 if the firm is included in FTSE All World Index
AUDIT	Rank of Strength of Auditing and Accounting Standards at country level

Table A2: Advantaged foreign investors labeled using Top 1, 2, 4, 5 industries in home country
This table represents OLS and 2SLS regressions of firm value (Tobin's Q) on foreign advantaged and remaining ownership. Foreign investors are labeled as advantaged if the firm's industry is one of their home country's Top 1 (Column 1 and 2), Top 2 (Column 3 and 4), Top 4 (Column 5 and 6), Top 5 (Column 7 and 8) industries in terms of market capitalization. The *FIO_A*, *FIO_R*, *DIO* are ordinal variables, from 1 to 3, lowest to highest tertiles of advantaged ownership, remaining ownership and domestic ownership. All independent variables are lagged by one year. Standard errors are clustered at the firm level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Top 1		Top 2		Top 4		Top 5	
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
FIO_A	0.035***	4.863***	0.064***	4.763***	0.095***	4.818***	0.051***	16.600*
	(2.63)	(3.71)	(4.89)	(3.73)	(7.33)	(3.08)	(4.47)	(1.66)
FIO_R	0.040***	-4.314***	0.025**	-3.314***	0.014	-5.182***	0.020*	-2.594
	(3.30)	(-3.51)	(2.12)	(-3.64)	(1.15)	(-3.58)	(1.80)	(-0.42)
IO_DOM	0.004	0.326***	0.003	0.140	0.002	0.140	0.003	-0.571
	(0.30)	(2.89)	(0.28)	(1.44)	(0.14)	(1.44)	(0.29)	(-0.96)
SIZE	-0.516***	-0.378**	-0.517***	-0.567***	-0.522***	-0.567***	-0.517***	-2.270**
	(-17.78)	(-2.34)	(-17.81)	(-3.48)	(-17.97)	(-3.48)	(-17.79)	(-2.05)
SGROWTH	0.150***	0.210***	0.150***	0.152***	0.150***	0.152***	0.150***	0.123
	(6.13)	(3.77)	(6.13)	(3.15)	(6.14)	(3.15)	(6.12)	(0.83)
LEV	0.248**	-0.479	0.248**	0.063	0.251**	0.063	0.247**	2.491
	(2.38)	(-1.24)	(2.39)	(0.19)	(2.41)	(0.19)	(2.37)	(1.31)
CASH	0.975***	1.799***	0.976***	1.415***	0.974***	1.415***	0.975***	-1.051
	(9.30)	(4.91)	(9.32)	(4.61)	(9.32)	(4.61)	(9.31)	(-0.68)
CAPEX	0.634***	1.705***	0.634***	0.715	0.627***	0.715	0.636***	-3.318
	(3.98)	(2.67)	(3.97)	(1.27)	(3.94)	(1.27)	(3.99)	(-1.05)
ROA	-0.005	-0.357*	-0.005	-0.094	-0.006	-0.094	-0.005	0.307
	(-0.04)	(-1.67)	(-0.04)	(-0.49)	(-0.05)	(-0.49)	(-0.04)	(0.57)
R&D	1.447***	2.337***	1.456***	2.784***	1.465***	2.784***	1.452***	1.216
	(3.29)	(2.93)	(3.31)	(3.95)	(3.34)	(3.95)	(3.30)	(0.60)
PPE	-0.198*	-0.465	-0.200*	-0.406	-0.198*	-0.406	-0.195*	-0.111
	(-1.82)	(-1.60)	(-1.84)	(-1.48)	(-1.82)	(-1.48)	(-1.79)	(-0.15)
FXSALE	-0.136***	0.250	-0.136***	0.064	-0.133***	0.064	-0.138***	-1.320
	(-3.24)	(1.51)	(-3.23)	(0.48)	(-3.18)	(0.48)	(-3.27)	(-1.62)
ANALYST	0.013***	0.032	0.013***	0.016	0.012***	0.016	0.012***	-0.214
	(3.97)	(1.43)	(3.97)	(0.76)	(3.78)	(0.76)	(3.94)	(-1.44)
CLOSE	0.131***	-0.504	0.128**	-0.475*	0.129**	-0.475*	0.128**	1.456
	(2.60)	(-1.52)	(2.53)	(-1.66)	(2.56)	(-1.66)	(2.53)	(0.89)
ADR	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
SW F (FIO_A)		*26.081*		*24.419*		*17.563*		*2.879*
SW F(FIO_R)		*20.633*		*32.471*		*18.665*		*4.439*
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
N	81410	81383	81410	81383	81410	81383	81410	81383
adj. R-sq	0.688		0.688		0.688		0.688	

3 Bridging statement

The first essay suggests monitoring as an important economic mechanism through which foreign institutional investors improve firm value (Aggarwal et al. [2011]; Bena et al. [2017]; Luong et al. [2017]). However, the literature so far has provided only indirect evidence by decomposing institutional ownership into independent/long-term investors' ownership and grey/short-term investors' ownership. In the second essay, I aim to explicitly investigate this economic mechanism and study how foreign institutional investors could affect corporate governance.

The first essay and Luong et al. [2017] also indicate that foreign investors could act as a bridge and bring knowledge spillovers from their home country to investees. It suggests that more diversified foreign ownership should benefit the invested firm, especially firm innovation, due to a larger pool of knowledge and connections. Thus, in the second essay, I study the diversity of foreign institutional ownership and examine whether more diversified shareholder could lead to higher innovation output.

Combining the two motivations, I ask the research question for the second essay: does the diversity among foreign institutional investors affect corporate governance? Could their influence to corporate governance impact firm innovation?

4 Foreign ownership diversity and board diversity

4.1 Introduction

Foreign institutional investors have been shown to play an important monitoring role in firm management. They promote better corporate governance around the world (Aggarwal et al. [2011]) and bring greater innovation output through monitoring (Bena et al. [2017]; Luong et al. [2017]). However, the literature so far has only provided indirect evidence to infer monitoring as economic mechanism [11] and little is known on how foreign investors affect corporate governance concretely. As important shareholders, foreign investors should not only affect firm performance and corporate actions by direct monitoring, but also influence organizations within the firm, such as the board of directors.

In this paper, I explore the role of foreign investors in the composition of the board of directors. More precisely, I first study whether diversity among foreign shareholders could bring diversity on corporate boards. This question is worth investigating given the current lack of board diversity worldwide. At the same time, board diversity has been associated with different firm outcomes (Knyazeva et al. [2021]) but little attention has been paid to the impact of shareholder characteristics on board diversity. Furthermore, to suggest board diversity as a valid channel, I verify whether board diversity affects firm innovation, as a key indicator of firm value.

As an important component of corporate governance, directors are elected by shareholders to represent their interests. The board attributes may simply reflect the attributes of ownership, as a direct consequence of shareholders' voting. However, the influence of shareholders on board elections is limited, given that the candidates are generally predetermined by the nomination committee of the current board. Due to the high costs of proxy fights, shareholders' votes have little impact on director elections,

[11] Aggarwal et al. [2011] construct a overall governance index and study governance outcome. Bena et al. [2017] and Luong et al. [2017] test the monitoring mechanism by classifying institutional investors into independent (long-term) institutions and gray (short-term) institutions.

especially for uncontested elections (Cai et al. [2009]). As a result, the slate of directors is likely to be driven by current directors and unlikely to result from shareholders' voting.

I investigate the impact of foreign ownership diversity on board diversity using U.S. firm-level data between 2001 and 2019. I first construct a multidimensional board diversity index by taking into account diversity of both demographic and cognitive factors. The board diversity index includes gender, age, nationality, culture, educational background, tenure, and expertise. I then build also a foreign ownership diversity index along three dimensions of diversity: culture, country of origin, and type.

The univariate results suggest that the average board diversity of the firms in the highest foreign ownership diversity tertile is 1.64 higher (30% of the sample average of board diversity index) than the average board diversity in the lowest tertile, while the average board diversity of the firms in the highest domestic ownership diversity tertile is 0.86 lower (16% of the sample average of board diversity index) than the average board diversity in the lowest tertile. Furthermore, the multivariate regressions show that board diversity increases by 0.48 when foreign ownership diversity changes from the lowest to the highest tertile using industry and year fixed effects and increases by 0.14 from the lowest to the highest tertile using firm and year fixed effects.

An important concern is that the results obtain because foreign ownership diversity is endogenously determined. Foreign investors from all countries and of all types may choose to invest in firms with higher board diversity. It is also possible that omitted time-varying firm-level variables are correlated with board diversity, even after controlling for firm fixed effects in the model specifications. To address the endogeneity problem, I employ two complementary empirical strategies: first, an instrumental variable (IV) estimation and second, a difference-in-differences design to isolate the exogenous variation in foreign ownership diversity.

I first use stock inclusion in FTSE All-World index as instrument for foreign ownership. Index inclusion has been successfully and widely used in related literature, such as Aggarwal et al. [2011] and Bena et al. [2017]. Institutional investors are more likely to invest in firms which are included in market indices and also use these indices as benchmarks (Cremers et al. [2016]). Furthermore, since the stock index inclusion largely depends on the firm's market capitalization ranking, the increase in foreign ownership diversity induced by the index inclusion is plausibly exogenous. The regression results using the IV identification strategy suggest a positive and causal effect of foreign ownership diversity on board diversity. I find that foreign ownership diversity generated by a one-standard-deviation increase in the instrumental variable leads to an increase of 0.17 in board diversity index (0.14 by OLS regression).

I then employ a difference-in-differences estimation around the time when the firm is included in the FTSE All-World Index. The treatment group consists of firms which are included in FTSE index from 2001 to 2019. The control group is firms matched using propensity score matching algorithm with firm-level variables. After verifying the parallel trend assumption before the event, I find that around the stock index inclusion, board diversity of the treatment group increases 31% more than the control group. Thus, both IV estimation and DiD test suggest that the positive effect of foreign ownership diversity on board diversity appears to be causal.

To provide support to the notion that their contribution to board diversity could be a valid mechanism through which foreign investors affect firm value, I then examine whether board diversity promote firm innovation, a key driver of firm performance. Using the population diversity of the county where the firm's headquarter is located as instrument, I show that firm with more diverse board have more patent counts.

Finally, I study the adoption of proxy access provisions at firm level as a case study. Proxy access gives the large and long-term shareholders the right to directly nominate

a certain number of candidates for board elections. On one hand, proxy access should enforce the positive effect of ownership diversity on board diversity, since shareholders can directly nominate their own representatives. On the other hand, it may shift excessive amount of power to the long-term and large shareholders. As a result, the influence of dispersed shareholders may decrease so that diverse ownership becomes less likely to contribute to board diversity. To test whether proxy access affects the positive effect of ownership diversity and board diversity, I redo the baseline regressions by adding the interaction term between foreign ownership diversity and proxy access dummy. The results suggest mixed effects for different components of diversity index measures.

This study makes several contributions to the literature. First, this paper suggests a novel mechanism through which foreign investors could affect corporate governance and firm value. Foreign ownership has been shown to improve firm value (Ferreira and Matos [2008]), promote better corporate governance (Aggarwal et al. [2011]) and bring greater innovation output (Bena et al. [2017]; Luong et al. [2017]). Bena et al. [2017] and Luong et al. [2017] identify monitoring as one of the economic underlying mechanisms by classifying institutional investors into independent (long-term) institutions and gray (short-term) institutions. Luong et al. [2017] also suggest knowledge spillovers and providing insurance to management as two other channels. While the literature mostly focused on the impacts of foreign ownership on firm performance and corporate actions, to the best of my knowledge, this paper is the first to examine in detail the effects of foreign ownership on firms' governing body. The far-reaching message highlighted in my research is that foreign ownership diversity by bringing diversity on boards is one of the contributing driver of firm innovation.

Second, this study also adds to the broad literature on board diversity. The determinants of board diversity have been shown to be related to firm characteristics. For example, firms with more complex operational structures are associated with more diverse boards (Anderson et al. [2011]; Knyazeva et al. [2013]). Firm with foreign in-

vestors and foreign operations are more likely to have foreign directors (Estélyi and Nisar [2016]). Management also affects board diversity (Coles et al. [2008]; Duchin et al. [2021]). Cronqvist and Yu [2017] suggest that CEOs who have a daughter are associated with more diverse boards. Furthermore, labor market supply (Knyazeva et al. [2013]; Alam et al. [2014]; Banerjee et al. [2018]; Hwang et al. [2018]; Greene et al. [2020]), and culture background (Giannetti and Wang [2021]; McLean et al. [2020]; Griffin et al. [2021]) could also influence board diversity. However, the impact of shareholders on board diversity has been little investigated. One exception is Gow et al. [2020] who study the shareholders' voting patterns in director elections and document that shareholders have not been proactive in promoting board diversity. I add to this literature by distinguishing shareholders into foreign and domestic owners. In this paper I provide empirical evidence which suggests that foreign ownership diversity contributes to board diversity.

Third, this paper also contributes to the literature on proxy access. The adoption of proxy access has been mainly studied at the market level (Becker et al. [2013]; Bebchuk [2003]; Bebchuk and Hirst [2010]). Since 2015, initiated by "Boardroom Accountability Project"[12], large U.S. public companies have adopted proxy access on a firm-by-firm basis. Bhandari et al. [2021] study the targets of shareholder proposal to implement proxy access and find that adoption of proxy access is concentrated in large, already-well-governed firms. I add to this literature by testing how proxy access influences the positive relation between ownership diversity and board diversity. My initial evidence indicates that the effects of proxy access are mixed: it empowers material shareholders for board elections but reduces the influence of dispersed investors.

Finally, this study also has practical policy implications and can help the regulators to improve board diversity. Inadequate corporate board diversity is an issue that

[12]The New York City Comptroller and New York City Pension Funds lunched "Boardroom Accountability Project" and targeted over 70 companies with non-binding proposals to adopt proxy access during each of the 2015, 2016 and 2017 proxy seasons (Holland et al. [2019]).

has attracted much attention from practitioners, policymakers, and media. This paper points out that attracting foreign investors could be an efficient way to alleviate this problem. Interestingly, the diversity among foreign investors, not necessarily the foreign ownership itself, is critical for board diversity. This paper further suggests that opening to foreign investment is beneficial for companies and that countries are likely to promote innovation by opening up to foreign investors.

The remainder of the paper is organized as follows. Section 2 introduces the multidimensional board diversity index, the ownership diversity measurements, and other variables. Section 3 shows the main results of baseline regressions. In Section 4, I address the endogeneity issue by using two-stage least squares tests with instrumental variables and a difference-in-differences approach. In Section 5, I examine the relation between board diversity and corporate innovation. In Section 6, I study the case of proxy access. The last section concludes.

4.2 Data and variables

To test whether ownership diversity brings board diversity, I construct the key and control variables mainly from three databases: institutional ownership from FactSet/Lionshares database, information on corporate boards from BoardEX, and firm-level control variables from CRSP and Compustat. I start with U.S. firms from BoardEx and then merge BoardEx (BoardEx Company ID), CRSP (PERMCO) and Compustat (GVKEY) using "BoardEx CRSP Compustat Company" linking table[13] provided by WRDS. FactSet/Lionshares database (FACTSET_ENTITY_ID) and CRSP (PERMCO) are also joined using the FactSet-CRSP linking table[14] by WRDS. Firms from the utilities sector (SIC codes 4900-4999) and the financial sector (SIC codes 6000-6999) are excluded. The final sample consists of 3,204 U.S. firms from 2001 to 2019, for a total of 22,281 firm-year observations.

[13]See BoardEx CRSP Compustat Company Link for more detailed information.
[14]See FactSet-CRSP linking table for more detailed information.

4.2.1 Board diversity index

I use data from BoardEx to compute the board diversity index. BoardEx provides detailed information of directors, such as age, gender, nationality, employment, educational background and professional certification. Similar to Bernile et al. [2018], for each year, I construct a board diversity measure based on seven different aspects of director characteristics : three demographic diversity measures (gender, age, nationality) and four cognitive diversity measures (culture, time served on board, education, financial expertise).

The fraction of female directors (PCT_FEMALE), the standard deviation of directors' age ($STDEV\_AGE$), and the standard deviation of time spent serving as director ($STDEV\_TIMEBD$) are directly provided by BoardEx. I compute the fraction of foreign directors ($PCT\_FOREIGN$), the average culture distance between two directors ($CULTURE\_DIS$), the Herfindahl concentration index based on educational institutions where directors received their Bachelor's degree ($HHI\_BACHELOR$), and the Herfindahl concentration index for directors with financial expertise ($HHI\_FINEXPERT$).

In particular, to measure the cultural diversity on board, I assign Hofstede cultural index[15] to each director, based on their nationality. Hofstede cultural index introduces six dimensions along which cultural values could be analyzed: individualism-collectivism, uncertainty avoidance, power distance (strength of social hierarchy), masculinity-femininity (task-orientation versus person-orientation), long-term orientation, and indulgence versus self-restraint. Following Frijns et al. [2016], I first compute the Euclidean distance of the culture scores between every two directors as a measure of culture distance between the two directors (Equation 6):

[15]See Hofstede Culture Index for the data and more detailed information.

$$CD_{a,b,t} = \sqrt{\sum_{k=1}^{6}(I_{k,a,t} - I_{k,b,t})^2/V_{k,t}} \tag{6}$$

Where a and b denote director, t denotes year, $CD_{a,b,t}$ is the culture distance between director a and b at t, k denotes the kth dimension of Hofstede cultural index, $I_{k,a,t}$ is the culture score on dimension k for director a at t, $I_{k,b,t}$ is the culture score on dimension k for director b, $V_{k,t}$ is the in-sample variance of the score for the cultural dimension k at t.

The board cultural diversity is computed as the average culture distance of all pairs of directors denoted by a and b (Equation 7):

$$BD\_CUL\_DIS_{f,t} = \frac{\sum_{a,b} CD_{a,b,t}}{m_t(m_t - 1)/2} \tag{7}$$

Where m_t denotes the board size, $BD\_CUL\_DIS_{f,t}$ is the measure of board cultural diversity of firm f at time t.

Like in Bernile et al. [2018][16], to compute board educational diversity, I categorise directors based on the institution where the directors received their Bachelor's degree. $HHI\_BACHELOR$ is the Herfindahl concentration index based on this classification, thus a higher number of $HHI\_BACHELOR$ indicates less diversity in educational background of directors. Financial experts on board is identified if the director has served as CFO, accountant, treasurer, financial controller, or holds CFA or CPA. The directors are classified as financial expert or non-financial expert. Board expertise diversity $HHI\_FINEXPERT$ is the Herfindahl concentration index based on this classification. Similarly to $HHI\_BACHELOR$, a higher number of $HHI\_FINEXPERT$ indicates less diversity in expertise of directors

To make the scale comparable, I normalize each diversity measure by its mean and standard deviation. I then sum up the seven measures to construct the equally-weighted board diversity index:

[16]The authors provide concrete examples on page 593.

$$
\begin{aligned}
BD\_DIV = & \, STDZ(PCT\_FEMALE) \\
& + STDZ(STDEV\_AGE) \\
& + STDZ(PCT\_FOREIGN) \\
& + STDZ(BD\_CUL\_DIS) \\
& + STDZ(STDEV\_TIMEBD) \\
& - STDZ(HHI\_BACHELOR) \\
& - STDZ(HHI\_FINEXPERT)
\end{aligned} \tag{8}
$$

In the final construction of the index, I subtract the two last Herfindahl index based measures since a higher value indicates higher degree of concentration and lower diversity of the related factor. Figure 7 draws the sample means of board diversity index from 2001 to 2019. It suggests relatively little variation before 2015 and strong upward trend afterward. Figure 10 shows an upward trend for the diversity of gender, foreign directors, culture, and financial experts, while a downward trend for the diversity of age, time on board, and education. Panel A of Table 18 reports the summary statistics of seven board diversity measures.

4.2.2 Ownership diversity index

I use FactSet/LionShares ownership database to construct a yearly ownership diversity index. This database collects the mandatory quarterly holding reports of institutional investors required by regulatory agencies and has been widely used in international finance literature (Ferreira and Matos [2008]; Aggarwal et al. [2011]; Bena et al. [2017]; Luong et al. [2017]; Kacperczyk et al. [2021]). FactSet/LionShares provides also information on the institution's and the firm's country of domicile, and the type of the institution.

I first divide institutional ownership into domestic and foreign ownership, based on

the fund and firm location. Following Schumacher [2018], I identify the domestic and foreign investors based on the country of residence of the fund's management company. A institution is labeled as foreign investor if it is domiciled in a country different from where the stock is listed and as domestic investor, otherwise. The ownership (%) is calculated as the number of shares held by the institutional investors divided by the firm's total number of shares outstanding.

The total sample of institutional ownership consists of 10,661 distinct financial institutions from 79 countries holding 15,388 U.S. firms from 2001 to 2019. Among the total sample of financial institutions, nearly 80% of the institutions are domestic investors, followed by foreign investors from the UK (4%) and foreign investors from Canada (3%). There are 22 distinct types of financial institutions, with around 52% of the total sample as investment adviser, following by hedge fund (20%) and private banking/wealth management (12%).

Foreign ownership diversity For each year, I measure three dimensions of diversity of foreign institutional ownership: the average culture distance between every two institutional shareholders, the Herfindahl concentration index based on institutions' country, and the Herfindahl concentration index based on institutions' type.

In particular, similar to the board cultural distance diversity measure, I assign Hofstede cultural index to each institutional shareholder, based on their domicile country. I first compute the Euclidean distance of the culture scores between every two institutions (Equation 9) as a measure of culture distance between the two institutions:

$$CD_{i,j,t} = \sqrt{\sum_{k=1}^{6}(I_{k,i,t} - I_{k,j,t})^2/V_{k,t}} \tag{9}$$

Where i and j denote institution, t denotes year, $CD_{i,j,t}$ is the cultural distance between institution i and j at year t, k denotes the dimension of Hofstede cultural in-

dex, $I_{k,i}$ is the culture score on dimension k for institution i, $I_{k,j}$ is the culture score on dimension k for institution j, $V_{k,t}$ is the in-sample variance of the score for the cultural dimension k at year t.

Ownership cultural diversity is computed as the holding weighted cultural distance of all pairs of institutions (Equation 10):

$$FIO\_CUL\_DIS_{f,t} = \sum_{i,j} \frac{FIO_{i,f,t}}{FIO_{f,t}} \frac{FIO_{j,f,t}}{FIO_{f,t}} CD_{i,j,t} \tag{10}$$

Where $FIO_{i,f,t}$ denotes institution i's ownership of firm f at t, $FIO_{j,f,t}$ is institution j's ownership of firm f at t, $FIO_{f,t}$ is total foreign ownership of firm f at t. $FIO\_CUL\_DIS_{f,t}$ is the foreign ownership cultural diversity of firm f at t and $\sum_{i,j} \frac{IO_{i,f,t}}{FIO_{f,t}} \frac{FIO_{j,f,t}}{FIO_{f,t}} = 1$.

Let C_h denote the set of all institutions in country h. The Herfindahl concentration index based on institutions' country is computed as Equation 11:

$$FIO\_HHI\_CTY_{f,t} = \sum_{h} (\frac{\sum_{i \in C_h, f, t} FIO_{i,f,t}}{FIO_{f,t}})^2 \tag{11}$$

Let T_n denote the set of all institutions of Type n. The Herfindahl concentration index based on institutions' type as Equation 12:

$$FIO\_HHI\_TYPE_{f,t} = \sum_{n} (\frac{\sum_{i \in T_n, f, t} FIO_{i,f,t}}{FIO_{f,t}})^2 \tag{12}$$

Similar to the board diversity index, I normalize each diversity measure by its mean and standard deviation to make the scale comparable. I then sum up the three measures to construct the equally-weighted foreign ownership diversity index (Equation 13):

$$\begin{aligned} FIO\_DIV = & \, STDZ(FIO\_CUL\_DIS) \\ & - STDZ(FIO\_HHI\_CTY) \\ & - STDZ(FIO\_HHI\_TYPE) \end{aligned} \tag{13}$$

I subtract the two Herfindahl index based measures because they measure the degree of concentration of the related factor. In other words, after construction, a higher value of FIO_DIV indicates higher diversity among foreign investors. Figure 8 shows the sample mean of foreign ownership diversity index from 2001 to 2019. Figure 11 draws the time series of sample means of three foreign ownership diversity measures. The figures suggest a strong upward trend of diversity from 2001 to 2010, and a falter upward trend afterward. Panel B of Table 18 reports the summary statistics of three foreign ownership diversity measures.

Domestic ownership diversity Domestic ownership diversity (DIO_HHI_TYPE) is measured by the Herfindahl concentration index for institutions' type (Equation 14):

$$DIO\_HHI\_TYPE_{f,t} = \sum_{n} \left(\frac{\sum_{i \in T_n, f, t} DIO_{i,f,t}}{DIO_{f,t}}\right)^2 \tag{14}$$

As with previously explained indices, I normalize domestic ownership type diversity measure (DIO_HHI_TYPE) by its mean and standard deviation (Equation 15):

$$DIO\_DIV = -STDZ(DIO\_HHI\_TYPE) \tag{15}$$

I use the inverse value of the Herfindahl concentration index because it measures the degree of type concentration among the domestic investors. Figure 9 shows the sample mean of domestic ownership diversity index from 2001 to 2019. It suggests an upward trend of domestic ownership diversity, especially since 2010. Panel B of Table 18 reports the summary statistics of the domestic investors' type concentration.

4.2.3 Other controls

The firm-level control variables on board are collected from BoardEx North America, including board size (BD_SIZE), board independence (BD_INDP), and a dummy indicating whether CEO is the chairman of the board (IF_CEO).

Other firm-level control variables are for the most part downloaded and computed from Compustat, including logarithm of total asset ($SIZE$), leverage (LEV), age of the firm (AGE), Tobin's Q (Q), ROA (ROA), cash ($CASH$), R&D ($R\&D$), capital expenditure ($CAPEX$) , property, plant, and equipment (PPE), and dividend payout ratio ($Dividend$). Foreign sales ($FXSALES$) and the number of segments that the firm operates (N_SEGM) are computed from Compustat Historical Segments. Number of analysts following the firm (N_ANA) is downloaded from I/B/E/S. Annualized stock daily return volatility (VOL) is calculated from CRSP. Panel C of Table 18 shows the results of summary statistics of firm-level controls.

4.3 Main results

In this section, I first conduct univariate tests and multivariate tests to study the effects of foreign ownership diversity on board diversity. I then examine whether the baseline results are driven by some dominant aspects of diversity indices by decomposing both board and ownership diversity index.

4.3.1 Baseline results: univariate and multivariate tests

To study the relation between ownership diversity and board diversity, I first look at the relation between the two indices in a univariate setting. I group firms by tertiles of foreign ownership diversity (FIO_DIV) and domestic ownership diversity (DIO_DIV). I then compare the sample average of board diversity among different tertiles. Table 19 reports the average of board diversity (BD_DIV) in the following year for each tertile sorting first by FIO_DIV and then by DIO_DIV. T1, T2 and T3 denote the lowest, the medium, and the highest tertiles, respectively. The last row of the table shows the differences in the sample average of board diversity (BD_DIV) between the highest and lowest tertiles, T3-T1.

Table 19 shows that the following year's average board diversity of the firms in the highest tertile sorting on foreign ownership diversity (FIO_DIV) is 1.64 (30% of the total sample average board diversity index) higher than the average of board diversity in the lowest tertile. Instead, sorting on domestic ownership diversity (DIO_DIV), the following year average board diversity of the firms in the highest FIO_NBS tertile is 0.86 (16% of the total sample average of board diversity index) lower than the average of board diversity in the lowest tertile. Thus, the univariate tests suggest a positive association between foreign ownership diversity and board diversity, while a negative, albeit smaller, association between domestic ownership diversity and board diversity.

I then investigate the relation between ownership diversity and board diversity in a multivariate setting. I run panel regressions as below:

$$\begin{aligned} BD\_DIV_{f,t} = \alpha + \beta_1 FIO\_DIV_{f,t-1} + \beta_2 DIO\_DIV_{f,t-1} \\ + Controls_{f,t-1} + \theta_f + \lambda_t + \epsilon_{f,t} \end{aligned} \tag{16}$$

Where f denotes the firm, t denotes the time period. The dependent variable is the board diversity index (BD_DIV). FIO_DIV denotes the diversity of foreign ownership (FIO), and DIO_DIV denotes the diversity of domestic ownership (DIO). $Controls_{f,t-1}$ are the lagged firm-level information, including board size (BD_SIZE), board independence (BD_INDP), a dummy indicating whether CEO is the chairman of the board (IF_CEO), foreign sales ($FXSALES$), number of segments that the firm operates (N_SEGM), logarithm of total asset ($SIZE$), leverage (LEV), age of the firm (AGE), Tobin's Q (Q), ROA (ROA), cash ($CASH$), R&D ($R\&D$), capital expenditure ($CAPEX$) , property, plant, and equipment (PPE), number of analysts following the firm (N_ANA), dividend payout ratio ($Dividend$), and annualized stock daily return volatility (VOL). I include the firm fixed effects γ_f to control for time-invariant firm characteristics and the time fixed effects λ_t to control for changes in board diversity affecting all firms simultaneously. In all regressions, to compute the t-statistic of the coefficients, I use robust standard errors clustered at the firm level. By doing so, I assume that observations are independent across firms, but not within firms.

The results of multivariate tests are reported in Table 20. Column (1) and (2) present the regression results with year fixed effects, Column (3) and (4) present the regression results with industry and year fixed effects, Column (5) and (6) present the regression results with firm and year fixed effects. In Column (1), (3), and (5), the variables of interest are dummy variables indicating the tertiles of foreign ownership diversity (FIO_DIV) and domestic ownership diversity (DIO_DIV). T2 and T3 are dummy variables that equal one if the firm's FIO_DIV (DIO_DIV) value belongs to the median and highest tertile, respectively. In Column (2), (4), and (6), the variables of interest are the original variables of foreign ownership diversity (FIO_DIV) and domestic ownership diversity (DIO_DIV).

Comparing the results in Column (2) and (6), R squares of the regressions adding firm fixed effects (0.755 in Column (6)) are nearly 3 times of R square using only year fixed effects (0.229 in Column (2)). In fact, by using firm fixed effects, the regressions examine the relation between the within firm changes in board diversity and in ownership diversity. In other words, firm fixed effects control for the effects of the omitted time-invariant firm-level characteristics which are both related to ownership diversity and board diversity. Thus, I focus on the results interpretation of the results in Column (5) and (6) with firm fixed effects.

The results in Column (5) indicate that in the following year, board diversity index increases by 0.144 (roughly 3% of the sample average board diversity) when FIO_DIV changes from the lowest to the highest tertile. The board diversity in the following year increase by 0.071 when FIO_DIV changes from the lowest to the median tertile. The coefficient estimate of $T3$ is significant at 10% level while the coefficient estimate of $T2$ is statistically insignificant. It suggests a monotonic and positive association between board diversity and foreign ownership diversity. Furthermore, the change in board diversity is negative and statistically insignificant shifting from the lowest to the highest

tertile of DIO_DIV. The results suggest an insignificant relation between board diversity and domestic ownership diversity. The results in Column (1) and (3) using year fixed effects and industry and year fixed effects also indicate a monotonic and positive association between board diversity and foreign ownership diversity, while a monotonic and negative relation between board diversity and domestic ownership diversity.

In Column (6), FIO_DIV and DIO_DIV are the original variables, foreign and domestic ownership diversity index. The results suggest that one-standard deviation increase in FIO_DIV leads to an increase of 0.02 standard deviation in board diversity in the following year. Even though the economic significance is relatively small, the coefficient estimate is statistically significant at 5% level. Furthermore, from Column (1) and (3), the economic significance of foreign ownership diversity coefficient is about 10 times larger when using year fixed effects and about 4 times larger when using industry and year fixed effects. The differences in economic magnitude inferred from the coefficient estimates using different fixed effects are likely due to the stickiness of board diversity at firm level.

Regarding other firm-level control variables, the coefficient estimates on foreign ownership level are significant and positive at 1% level using industry and year fixed effects, while statistically insignificant using firm and year fixed effects. The coefficient estimates on domestic ownership level are significant and negative at 1% level using industry and year fixed effects, while statistically insignificant using firm and year fixed effects. It suggests that the effect of ownership level on board diversity is largely driven by time-invariant unobserved firm-level variables. Furthermore, firms with larger board size, more independent board, operating in more segments, larger size, higher R&D spending, and less volatile stock returns are associated with higher board diversity.

Overall, the baseline results from both univariate and multivariate tests indicate that the coefficient estimates on foreign ownership diversity (FIO_DIV) are positive and sig-

nificant at 5% level across all specifications, suggesting a monotonic positive association between foreign ownership diversity and board diversity.

4.3.2 Decomposing board and ownership diversity indices

An interesting question is whether the baseline results are driven by some particular components of the diversity index. I examine this aspect in this section by decomposing each component for the two diversity indices.

Table 21 reports the results of the analysis of decomposing the board diversity index. The dependent variables are normalized gender ratio, average cultural distance between two directors, the percentage of foreign directors, the standard deviation of directors' age, the standard deviation of time that directors served on board, educational diversity and expertise diversity, from Column (1) to (7) respectively. Table 22 reports the results of the analysis when excluding each component from the board diversity index.

The results of Table 21 and Table 22 suggest that no single component of the board diversity index drives the baseline results in general, except for the gender ratio. It could be explained by the strong attention on gender diversity on corporate board from the governments and the media. Overall, the analyses imply that foreign ownership diversity is positively associated with the common variation of different aspects of the board diversity.

Table 23 reports the results of the analysis when I decompose the ownership diversity index. The dependent variables are the board diversity index. The variables of interest are each normalized component of ownership diversity, from Column (1) to (4) respectively. In Column (2), $FIO\_DIV\_CTY = -FIO\_HHI\_CTY$, is the inverse value of the HHI of foreign ownership country concentration. In Column (3), $FIO\_DIV\_TYPE = -FIO\_HHI\_TYPE$, is the inverse value of the HHI of foreign

ownership type concentration. In Column (4), $DIO\_DIV = -DIO\_HHI\_TYPE$, domestic ownership diversity is the negative value of the HHI of domestic ownership type concentration. Table 24 reports the results of the analysis when excluding each component from the foreign ownership diversity index.

First, the results of Table 23 show that the coefficient estimates of cultural distance and country diversity are significant at 5% and 10% level, respectively, while the coefficient estimate of institution type diversity is insignificant. Second, the results of Table 24 also indicate that cultural distance is important for the statistical significance of the baseline results. Overall, the analyses suggest that cultural distance and country diversity within foreign investors contributes to the positive relation between ownership diversity and board diversity while type diversity, of both foreign and domestic ownership, seems to be unrelated to board diversity. This result may give hints to explain why foreign ownership diversity is positively correlated with board diversity, while the association between domestic ownership diversity and board diversity is insignificant. Unsurprisingly, foreign investors are characterised by their heterogeneity in country of origin and culture, which contribute to board diversity.

To conclude, the tests on components of the board diversity index suggest that foreign ownership diversity is positively associated with the common variation of different aspects of board diversity. The analyses on components of the ownership diversity index point out that culture and country diversity of foreign investors matters for board diversity.

4.4 Identification tests

The evidence so far suggests a positive and significant association between foreign ownership diversity and board diversity. However, an important concern is that the results exist because foreign ownership diversity is endogenously determined. For example, foreign investors may choose to invest in the firms with greater board diversity, so that

foreign ownership diversity could be higher for those firms. It is also possible that unobservable time-varying firm-level variables are correlated with board diversity, even after controlling for firm fixed effects in the model specifications. Furthermore, ownership diversity variables are subject to measurement errors, as neither cultural distance measure nor Herfindahl concentration index can perfectly capture ownership diversity. To address the simultaneity bias, the omitted variable problem, and measurement errors, I employ first instrumental variables and then difference-in-differences identification strategies to isolate the exogenous variation in ownership diversity.

4.4.1 Instrumental variable

I implement an instrumental variable strategy using two-stage least squares (2SLS) regressions. Similar to Aggarwal et al. [2011], Bena et al. [2017], Luong et al. [2017] and Kacperczyk et al. [2021], I use the stock inclusion in FTSE All-World index as instrumental variable for foreign ownership diversity.[17]

FTSE All-world index, a market-capitalization weighted index, starts in 1986 and covers nearly 95% of the global investable market capitalization. Foreign institutional investors are more likely to invest in the firms which are included in the market index (Ferreira and Matos [2008]) and use these indices as benchmarks (Cremers et al. [2016]). Therefore, foreign ownership, from all around the world and with all types, should increase after the inclusion in FTSE index, so that foreign ownership diversity should also increase. As a result, one can argue that this instrument satisfies the relevance condition.

With respect to the exclusion condition, it is the case that a firm's inclusion in FTSE All-World index is largely determined by the mechanical rule based on the market capitalization ranking. The increase in foreign institutional ownership induced by stock index inclusion should be plausibly exogenous. This implies that the index inclusion

[17] Aggarwal et al. [2011], Bena et al. [2017], Luong et al. [2017] and Kacperczyk et al. [2021] use the stock inclusion in MSCI All Country World Index as an instrument for foreign ownership.

should not directly affect board diversity, except through ownership changes. I define the instrument as a dummy variable ($FTSE$) that equals 1 is the firm is included in FTSE All-World index in year t, and 0 otherwise.

Table 25 reports the results of IV estimation. In Column (1) and (2), FIO_DIV is the original foreign ownership diversity index. In Column (3) and (4), FIO_DIV is the ordinal variable from 1 to 3, the lowest to the highest tertiles of foreign ownership diversity index. As shown in Column (1) and (3), I include firm-level controls in the first-stage tests. The coefficient estimates of $FTSE$ are positive and significant at 1% level for explaining FIO_DIV, which is consistent with the prediction. F-statistics reported in the bottom of the table reject the null of weak instruments at 1% level and suggest that the instrument seems to be highly correlated with the endogenous variables.

Column (2) and (4) of Table 25 shows the results of second-stage tests. Using the original foreign ownership index, the coefficient estimate on FIO_DIV is positive and significant at 5% level. It suggests that the increase in predicted FIO_DIV generated by a one-standard-deviation increase in the instrument is associated with an increase in BD_DIV of 0.17. Using ordinal variables of foreign ownership diversity index, the coefficient estimate on FIO_DIV is positive and significant at 1% level. In this case, the increase in predicted FIO_DIV generated by a one-standard-deviation increase in the instrument is associated with an increase in BD_DIV of 0.37. These results are quantitatively similar to the baseline OLS regression estimates in Table 20.

Compared with OLS regressions results, the economic magnitude of the coefficient estimates from IV estimates seems to be greater. In fact, while the correlation of the omitted variables and board diversity that could explain such pattern is unclear, the simultaneity bias implies that the OLS estimator is likely to over-estimate the effects of foreign ownership diversity on board diversity. One possible explanation is the "local average treatment effect" (LATE). The IV estimation estimates the effects of the

treatment for those who respond to the exogenous shocks (Jiang [2017]). As a result, IV estimates could produce an effect larger than the true population. Another possible explanation is that measurement error in independent variable generally brings attenuation bias, which also results in larger IV estimates.

In summary, consistent with my hypothesis, the identification tests using IVs suggest that the positive effect of foreign ownership diversity on board diversity appears to be causal. However, it is important to mention that the inclusion in FTSE All-world index is certainly not perfectly exogenous to board diversity. For example, FTSE index may take into account board diversity when including a firm in the index. Therefore, I cannot completely rule out the endogeneity problem and should be cautious when interpreting the results.

4.4.2 Difference-in-differences

In this section, I use the stock inclusion in FTSE All-World Index as a quasi-natural experiment for a difference-in-differences estimation around the time when the firm is included in the index. I use this approach to compare the board diversity of treatment group and control group 3 years before the event and 3 years after the event.

I identify 341 additions to the index from 2001 to 2019, which are served as treatment group. I select the control group using propensity score matching based on the firm-level variables one year before the index inclusion: foreign ownership diversity (FIO_DIV), domestic ownership diversity (DIO_DIV), foreign ownership (FIO), domestic ownership (DIO) and board diversity index (BD_DIV). I match each treatment firm with 3 control firms using the nearest neighbor propensity score matching (PSM) algorithm.

The validity of the DID test depends on the parallel-trend assumption. I first compute the univariate difference between the treatment and control group for board di-

versity before the event. The results in Panel A of Table 26 suggest that there is no significant difference between the trend of the two groups in the pre-treatment period. I also plot the average board diversity of the two groups over the seven-year period. Figure 12 shows that the two lines before the event seem to be close to each other. Furthermore, the result in Panel B of Table 26 suggests that the univariate estimate of DiD between two groups is significant and that the exogenous increase in foreign ownership diversity after the stock index inclusion leads to an increase in board diversity.

I then perform DiD test in a multivariate regression framework:

$$\begin{aligned} BD\_DIV_{f,t} = \alpha + \beta TREAT_i \times POST_t + +\beta_1 DIO\_DIV_{f,t-1} \\ + Controls_{f,t-1} + \gamma_f + \lambda_t + \eta_{event\_t} + \epsilon_{f,t} \end{aligned} \tag{17}$$

Where $TREAT$ is a dummy variable that equals 1 if the firm is in the treatment group and 0 if the firm is in the control group. POST is a dummy variable that equals 1 if it is after the event and 0 if it is before the event. Controls are the same firm-level control variables as in the baseline regression. γ_f is the firm fixed effect, λ_t is the year fixed effect, and η_t is the event year fixed effect. The coefficient β before $TREAT_i \times POST_t$ is the DiD estimator that captures the causal effect of foreign ownership diversity on board diversity.

Table 27 shows the results of DID tests. In column (1), the coefficient before $TREAT_i \times POST_t$ is positive and significant, which suggests that foreign ownership diversity of the treated group increases more than the control group after being included in FTSE index. Column (2) reports the results of board diversity as dependent variable. The coefficient before $TREAT_i \times POST_t$ is positive and significant at 10% level. It indicates that treatment group firms experience a larger increase in board diversity than the control group. The DiD estimator is 0.310, suggesting that board diversity of the treatment group increases 31% higher than the control group around the stock index inclusion.

In conclusion, the identification results of IV estimation and DiD tests help to alleviate largely the concern for the endogeneity problem of the foreign ownership diversity (FIO_DIV). The positive relation between foreign ownership diversity and board diversity appears to be causal. However, since either IV estimation or DiD using the FTSE All-world index inclusion is perfectly exogenous, the results need to be interpreted with caution.

4.5 Board diversity and corporate innovation

The results so far suggest that greater foreign ownership diversity leads to higher board diversity. In this section, to examine whether board diversity is a valid mechanism, I study whether board diversity promotes corporate innovation, a key driver of firm value.

Recent research has shown that different dimensions of board diversity affect corporate innovation. For example, Griffin et al. [2021] show that firms with gender diverse boards have more patents counts and higher innovation efficiency using international data. Ma et al. [2022] find that board knowledge diversity spurs firm radical innovation through the directors' advisory function. An et al. [2021] use also a multi-dimensional diversity measure and find evidence that firms with diverse boards engage in more exploratory innovations and develop new technology in unfamiliar areas.

To provide support to the notion that foreign ownership diversity is beneficial for companies, I follow closely An et al. [2021] and verify that in my sample and based on my measures companies with diverse boards generate a higher patent count. I run a multidimensional regression of board diversity on firms' next year patent counts. Table 28 shows the results of the regressions. The dependent variable is the natural logarithm of 1 plus the firm's number of patent counts one year ahead. The results in Column (1) and (2) suggest a positive association between the number of patent counts of the firm

and board diversity. Using industry and year fixed effects, the coefficient estimates of BD_DIV in Column (2) suggest that one standard deviation increase in board diversity index leads to an increase of 0.036 in the firm's patent count (4% of the sample mean).

However, the results may exist because more innovative firms are more likely to have diverse board, pointing to reverse causality. Following Anderson et al. [2011] and An et al. [2021], I use the population diversity of the county where the firm is headquartered as an instrument for board diversity. Anderson et al. [2011], Knyazeva et al. [2013], and Hwang et al. [2018] provide evidence that the supply-side constraints of the director local market affect corporate board diversity. Therefore, it should be easier for firms located in counties with more diverse population to search for heterogeneous directors.

I introduce the county-level population diversity as a new instrumental variable for board diversity instead of using the FTSE All-World index because the former should outperform the latter regarding the relevance condition in this setting. First, the county-level population diversity should affect firms' board diversity in general, while only the firms which are included or nearly included in the index may react to FTSE index inclusion. Second, even though FTSE index inclusion could improve board diversity, it may not be a first order effect but a result from foreign ownership changes.

The demographic information on population age, gender, race and employment by industry is downloaded from U.S. Census Bureau. I construct the county population diversity measurement following Anderson et al. [2011]. For each year, I compute the population age HHI of 18 age brackets, the race HHI, the percentage of female population, and the employment HHI based on the industry classification. I rank the counties into quartiles based on each diversity measure and sum up the four rankings for each county. I obtain firm location (ZIP code) from Compustat and match it with the population information using the ZIP Code Crosswalk file provided by Office of Policy Development and Research.

Column (3) and (4) of Table 28 show the results of two-stage least squares (2SLS) tests. The first-stage test suggests that county population diversity is positively associated with board diversity and F statistics rejects the hypothesis of weak instrument. The coefficient estimate of instrumented board diversity index is positive and significant at 10% level in the second-stage test. It suggests a causal effect of board diversity on the firm's patent count.

To conclude, the results from the baseline tests and the tests using identification strategies provide evidence that foreign ownership diversity positively affects board diversity. In this section, I verify that diverse board promotes firm innovation in my sample. Taken together, it suggests that board diversity could be a plausible mechanism through which foreign institutional investors affect firm value.

4.6 Case study: proxy access

In this section, I test whether proxy access affects the positive effect of foreign ownership diversity on board diversity. Proxy access gives the large and long-term shareholders of a company the right to nominate a limited number of directors on the company's proxy card (ballot) at the firm's annual shareholder meeting.[18]

Since 2003, after the WorldCom and Tyco scandals, the SEC has attempted to adopt proxy access rule for all U.S. public firms. In August 2010, the SEC put forward a proxy access rule (Exchange Act Rule 14a-11) that would have given shareholders holding more than 3% of the company's shares for at least 3 years the ability to nominate candidates for board of directors (Holland et al. [2019]). This rule was supposed to take effect in November 2010 for the following year proxy season. In September 2010, the Business

[18] According to Sidley Corporate Governance Report, 83% of companies that adopted proxy access in 2017 agreed on the following terms: shareholder ownership of more than 3% for at least 3 years has the right to nominate for up to 20% of the board (at least 2 directors) with a nominating group size limit of 20).

Roundtable challenged the validity of Rule 14a-11 mainly arguing that the rule would "shift a dangerous amount of power to certain kinds of shareholders (for example, union pension funds)" (Becker et al. [2013]). In July 2011, the U.S. Court of Appeals for the District of Columbia Circuit struck down the rule, siding with the Business Roundtable's arguments. The SEC did not appeal the court's decision, allowing the adaption of proxy access on a firm-by-firm basis.

Since 2015, under the pressure from New York City Pension Funds, other large institutional investors and Council of Institutional Investors (CII), known as the "Boardroom Accountability Project", proxy access adoption has been an increasingly common phenomenon among the large U.S. public companies. Indeed, it is the case that 71% of S&P500 companies have adopted proxy access up until 2019 (Holland et al. [2019]).

Proxy access may affect the baseline results in multiple ways. On the one hand, proxy access gives more power to shareholders for board elections and firms adopting this rule should be less likely to suffer from agency problem. It can thus be argued that the proxy access adoption should strengthen the relation between ownership diversity and board diversity. On the other hand, proxy access also shifts more power to the long-term and large shareholders. As a result, the influence of numerous smaller shareholders may be reduced, so that the dispersed ownership becomes less likely to contribute to board diversity. In case of collation of shareholders in order to meet the rule requirement, it forces shareholders to align their interests, which may reduce the divergence among the shareholders. Therefore, proxy access may also reduce the positive effect of ownership diversity on board diversity. Finally, it is also possible that proxy access has no effect on the baseline results. Bhandari et al. [2021] show that proxy access adoptions are concentrated in already-well-governed firms so that the effectiveness of proxy access on corporate governance is limited.

I download the firm-level proxy adaption data from the website of Council of Insti-

tutional Investors[19], to investigate whether adaption of proxy access rule reinforces the positive effect of ownership diversity on board diversity. The Council of Institutional Investors collects the name of firms which adopted proxy access and the date of the adoption. I found 436 firms and more than 77% of the events happened in 2015 and 2016. I construct time variant firm-level dummy IF_PROXY, which equals 1 if the firm has adopted the rule at t, and 0 otherwise. I identifies 258 adoptions of proxy access in my sample.

Table 29 reports the results of the baseline regressions (16) but including proxy access dummy IF_PROXY and the interaction term between foreign ownership diversity FIO_DIV and proxy access dummy IF_PROXY. In Column (1) to (3), FIO_DIV is the original variable. The results show that the coefficient estimates of the interaction are all insignificant with different fixed effects, suggesting that proxy access has little impact on the relation between ownership diversity and board diversity. In Column (4) to (6), FIO_DIV is the ordinal variable, from 1 to 3, indicating the lowest to highest tertile of foreign ownership diversity index, respectively. With industry and year fixed effects, the coefficient estimates of the interaction term is negative and significant at 10% level. It suggests that when a firm adopts proxy access, the relation between foreign ownership diversity and board diversity is weaker. Based on the one of the arguments provided above, it is possible that proxy access shifts large amount of power to material ownership or force shareholders to unify their interests. As a result, adopting such rule may reduce the positive effect of foreign ownership diversity on board diversity.

I then redo the same exercises for each component of board diversity index and ownership diversity index. The results suggest a mixed effect of proxy access for different diversity dimensions. Table 30 shows the results of regressions of decomposing board diversity. I report the results of regressions when the dependent variable is gender ratio, percentage of foreign directors and educational diversity. For gender ratio, in Column

[19]See Proxy Access by Council of Institutional Investors

(1) to (3), the coefficient estimates of the interaction term of foreign ownership diversity and proxy access dummy are positive and significant at least at 10% level. It indicates that the positive effect of ownership diversity on gender ratio is more pronounced after the adoption of proxy access, and it may imply that the long-term and large shareholders promote women on board. For the percentage of foreign directors on board, the coefficient estimate of the interaction term is negative and significant at 5% level using industry and year fixed effect in Column (4) and (5). It may suggest that smaller and more dispersed foreign shareholders contribute to board nationality diversity. For educational diversity, the coefficient estimates of the interaction term are positive and significant at 5% level using industry and year fixed effect in Column (7) and (8). I do not report the results based on the other board diversity measures, since the coefficient estimates of the interaction term are insignificant.

Table 31 presents the results on components of the foreign ownership diversity index, focusing on culture diversity in the first 3 columns, country diversity in the following 3 columns, and type diversity in the last 3 columns. I find that only the coefficient estimates of the interaction term between foreign ownership type diversity and proxy access is significant at 1% level using industry and year fixed effects in Column (7) and (8). The negative coefficient indicates that the positive effect of type ownership diversity on board diversity is less pronounced after adoption of proxy access. It may imply that smaller and more dispersed foreign shareholders with heterogeneous institution types contribute to board diversity.

Overall, the evidence suggests that adopting proxy access has mixed effects on the positive effect of foreign ownership diversity on board diversity. The positive effect of foreign ownership diversity on gender ratio and educational diversity seems to be more strengthened after the adoption of proxy access while less pronounced in the case of country diversity.

4.7 Conclusion

This paper suggests a novel mechanism through which foreign institutional investors affect firm value, by investigating the impact of foreign ownership diversity on board diversity. Using U.S. firm-level data between 2001 and 2019, I show that foreign ownership diversity is positively associated with board diversity. I address the endogeneity problem by using FTSE All-World Index inclusion as instrumental variable and as quasi-natural experiment. The results of the identification strategies support the causal effect of foreign ownership diversity on board diversity. I then verify that in my sample and based on my measures board diversity improves firm innovation, by using country level population diversity of the firm's headquarter location as instrumental variable. Taken together, it suggests that board diversity could be a plausible channel through which foreign investors affect firm value. In addition, firm-level proxy access adoption seems to have little impact on the positive effect of foreign ownership diversity and board diversity.

4.8 Figures

Figure 7: Board Diversity Index
This figure plots the average board diversity index BD_DIV across all the firms in the sample from 2001 to 2019.

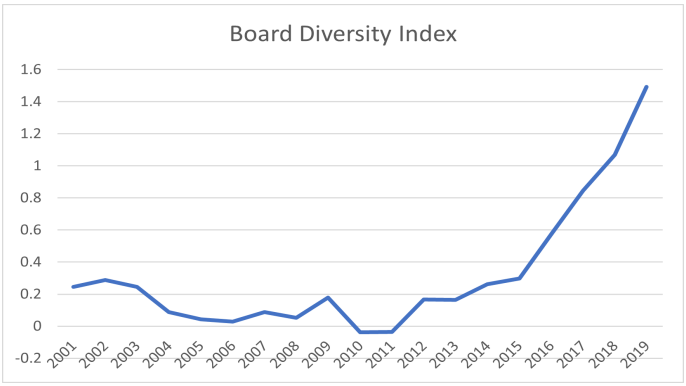


Figure 8: Foreign IO Diversity Index
This figure plots the average foreign ownership diversity index FIO_DIV across all the firms in the sample from 2001 to 2019.

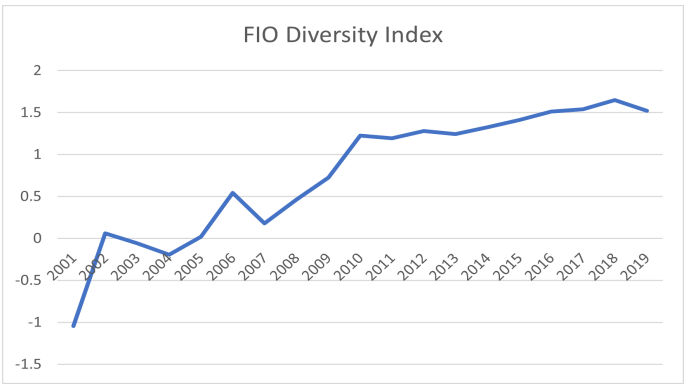


Figure 9: Domestic IO Diversity Index
This figure plots the average domestic ownership diversity index DIO_DIV across all the firms in the sample from 2001 to 2019.

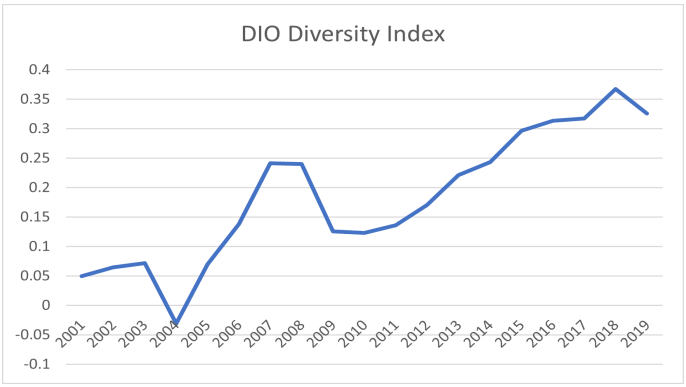
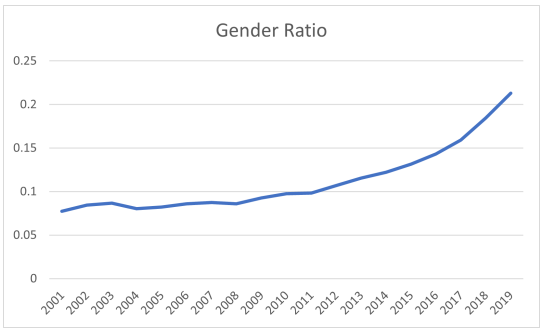
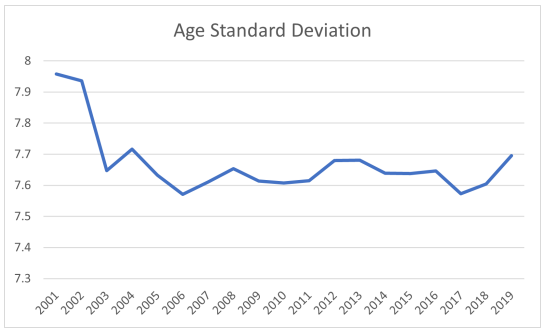
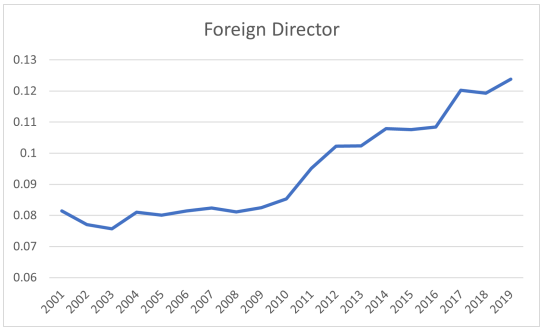
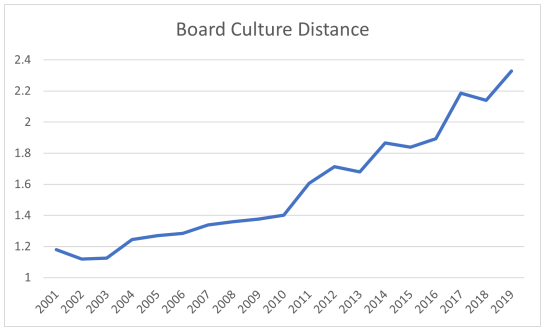


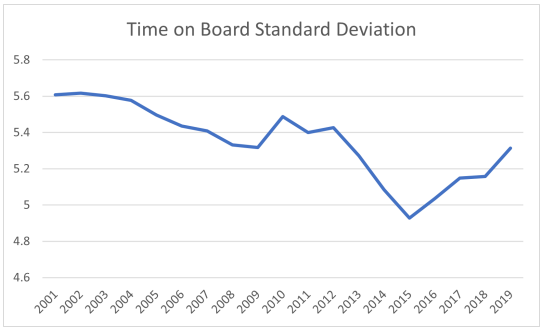
Figure 10: Board Diversity Measures
This figure plots the sample mean of each component of the board diversity index from 2001 to 2019, the fraction of female directors (gender ratio), the standard deviation of directors' age, the percentage of foreign directors on board, the standard deviation of time spent serving as director, the average culture distance between two directors, the Herfindahl concentration index based on educational institutions where directors received their Bachelor's degree, and the Herfindahl concentration index for directors with financial expertise.











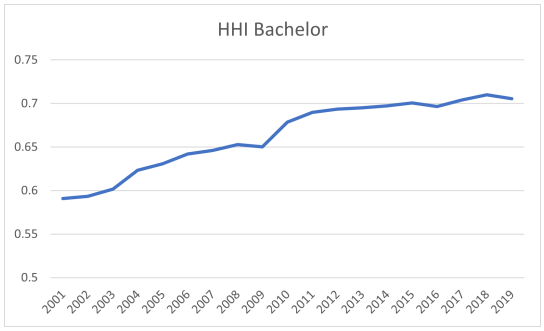


Figure 11: Foreign IO Diversity Measures
This figure plots the sample mean of each component of the foreign ownership diversity index from 2001 to 2019, the average culture distance between two institutions, the Herfindahl concentration index based on the institution's home country, and the Herfindahl concentration index based on the insitution's type.

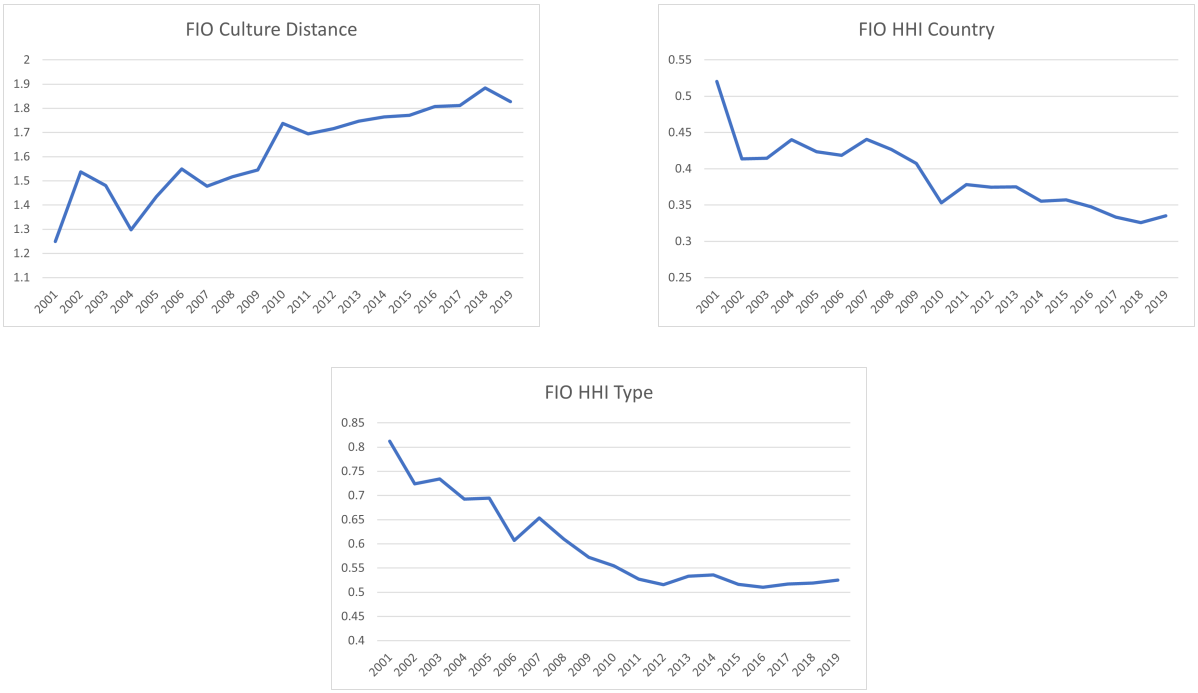
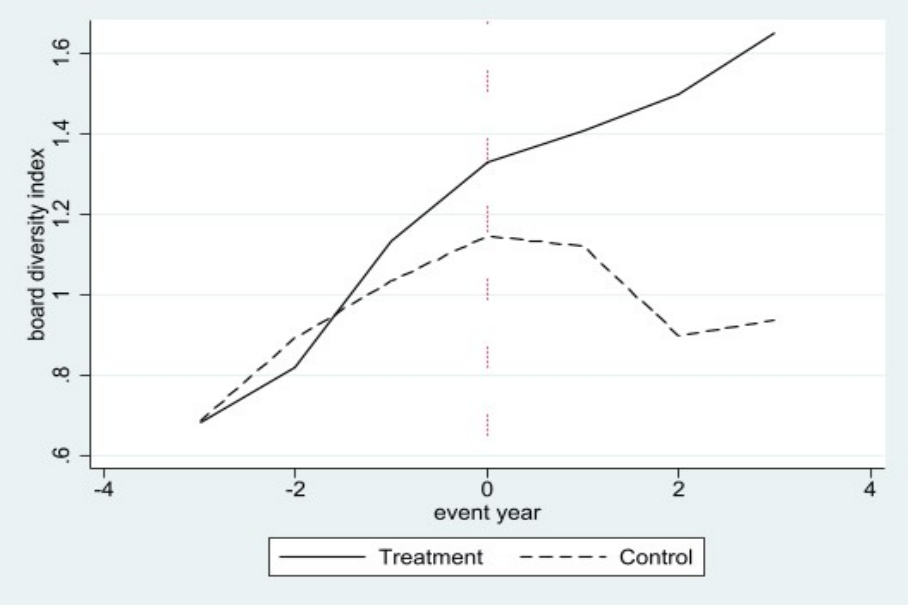


Figure 12: Did: Board Diversity Index
This figure plots the average board diversity index of the treatment group (dark line) and of the control group (dotted line) around the firm's inclusion in FTSE All-World Index.



4.9 Tables

Table 18: Summary statistics
This table shows mean, standard deviation, number of observation, minimum, 25 percentile, median, 75 percentile, and maximum for each variable. Variable definitions are provided in Table A.1 in the Appendix. Panel A reports the summary statistics on seven board diversity measures. Panel B reports the summary statistics on three ownership diversity measures. Panel C reports the summary statistics on firm-level controls.

Variables	Mean	STD	N	MIN	P25	P50	P75	MAX
Panel A: Board diversity								
PCT_FEMALE	0.112	0.107	22281	0.000	0.000	0.111	0.182	0.800
SD_AGE	7.656	2.360	22281	0.800	6.000	7.400	9.100	18.200
PCT_FOREIGN	0.094	0.169	22281	0.000	0.000	0.000	0.200	0.900
BD_CUL_DIS	1.580	3.333	22281	0.000	0.000	0.000	1.501	17.977
SD_TIMEBD	5.342	3.455	22281	0.000	2.800	4.800	7.200	22.100
HHI_BACHELOR	0.666	0.133	22281	0.322	0.570	0.680	0.781	0.858
HHI_FINEXPERT	0.714	0.138	22281	0.500	0.603	0.702	0.802	1.000
Panel B: Ownership diversity								
FIO_CUL_DIS	1.629	0.719	22281	0.000	1.192	1.764	2.167	3.514
FIO_HHI_CTY	0.390	0.226	22281	0.115	0.223	0.316	0.489	1.000
FIO_HHI_TYPE	0.590	0.219	22281	0.212	0.417	0.541	0.748	1.000
DIO_HHI_TYPE	0.437	0.098	22281	0.224	0.370	0.426	0.489	1.000
Panel C: Controls								
FIO	0.044	0.045	22281	0.000	0.011	0.028	0.064	0.298
DIO	0.694	0.230	22281	0.002	0.561	0.753	0.878	0.996
N_BD	10.089	3.015	22281	4.000	8.000	10.000	12.000	18.000
IND_BD	0.578	0.146	22281	0.091	0.474	0.571	0.700	0.857
IF_CEO	0.457	0.498	22281	0.000	0.000	0.000	1.000	1.000
FXSALES	0.279	0.268	22281	0.000	0.001	0.220	0.468	0.967
N_SEGM	2.966	2.082	22281	1.000	1.000	3.000	4.000	9.000
SIZE	6.846	1.579	22281	1.380	5.725	6.808	7.918	10.823
LEV	0.219	0.213	22281	0.000	0.018	0.187	0.339	1.854
AGE	20.768	15.346	22281	0.000	9.000	16.000	29.000	68.000
Q	1.842	1.482	22281	0.262	0.974	1.397	2.172	29.362
ROA	0.000	0.188	22281	-4.067	-0.009	0.041	0.080	0.234
CASH	0.198	0.205	22281	0.000	0.041	0.121	0.289	0.932
R&D	0.045	0.078	22281	0.000	0.000	0.007	0.062	0.537
CAPEX	0.047	0.047	22281	0.000	0.017	0.032	0.058	0.309
PPE	0.235	0.214	22281	0.000	0.073	0.161	0.330	0.911
NUM_ANA	8.475	6.912	22281	1.000	3.333	6.417	11.750	47.417
Dividend	0.058	0.103	22281	0.000	0.000	0.000	0.088	0.621
VOL	0.467	0.221	22281	0.158	0.307	0.414	0.570	1.268

Table 19: Ownership diversity and board diversity: Univariate tests
This table presents average board diversity (BD_DIV) grouped by tertiles of foreign ownership diversity (FIO_DIV) and domestic ownership diversity (DIO_DIV). The first (T1), second (T2), and third (T3) tertiles represent groups with the lowest, medium, and highest values of the corresponding variable, respectively. The sample period is from 2001 to 2019. The last row reports the differences of sample mean between the highest and the lowest tertiles and their corresponding t-statistic. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

FIO_DIV	All sample		DIO_DIV	All sample	
	Mean	STD		Mean	STD
T1 (Low)	4.873	4.34	T1 (Low)	5.948	4.34
T2	5.767	4.32	T2	6.111	4.29
T3 (High)	6.509	4.21	T3 (High)	5.092	4.23
	Diff	t-stats		Diff	t-stats
T3-T1 (High-Low)	1.64***	23.34	T3-T1 (High-Low)	-0.86***	-12.16

Table 20: Ownership diversity and board diversity: Multivariate tests
This table shows the results of multivariate regressions using different measures of ownership diversity. The dependent variable is board diversity (BD_DIV). Column (1), (3), and (5) use dummy variables indicating the tertiles of foreign ownership diversity and domestic ownership diversity. Column (2), (4) and (6) use the original variable, foreign ownership diversity (FIO_DIV) and domestic ownership diversity (DIO_DIV). Column (1) and (2) represent the regression results with year fixed effects. Column (3) and (4) represent the regression results with industry and year fixed effects. Column (5) and (6) represent the regression results with firm and year fixed effects. All independent variables are lagged by one year. Standard errors are clustered at the firm-level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

		(1)	(2)	(3)	(4)	(5)	(6)
FIO_DIV	T2	0.300***	0.127***	0.249***	0.123***	0.071	0.033**
		(3.19)	(4.81)	(2.90)	(5.06)	(1.31)	(2.08)
	T3	0.499***		0.478***		0.144*	
		(3.88)		(4.18)		(1.90)	
DIO_DIV	T2	-0.114	-0.275***	-0.084	-0.233***	-0.036	0.020
		(-1.16)	(-3.80)	(-0.95)	(-3.53)	(-0.58)	(0.41)
	T3	-0.517***		-0.461***		-0.003	
		(-4.44)		(-4.30)		(-0.04)	
FIO		6.017***	6.445***	4.899***	5.352***	0.349	0.426
		(3.79)	(4.06)	(3.31)	(3.63)	(0.27)	(0.33)
DIO		-1.089***	-1.202***	-1.025***	-1.157***	-0.239	-0.281
		(-3.83)	(-4.10)	(-3.75)	(-4.10)	(-0.90)	(-1.04)
N_BD		0.222***	0.222***	0.211***	0.211***	0.220***	0.220***
		(7.35)	(7.34)	(7.42)	(7.43)	(8.96)	(8.96)
IND_BD		-4.821***	-4.790***	-4.029***	-3.991***	-2.165***	-2.160***
		(-10.11)	(-10.07)	(-9.12)	(-9.04)	(-5.91)	(-5.90)
IF_CEO		-0.051	-0.055	0.028	0.024	-0.093	-0.093
		(-0.43)	(-0.47)	(0.25)	(0.22)	(-1.03)	(-1.03)
FXSALES		0.767***	0.772***	1.290***	1.288***	0.284	0.289
		(2.96)	(2.98)	(4.31)	(4.30)	(0.79)	(0.80)
N_SEGM		0.026	0.027	0.068**	0.069**	0.078***	0.078***
		(0.79)	(0.81)	(2.12)	(2.17)	(2.86)	(2.85)
SIZE		-0.145*	-0.181**	-0.026	-0.066	0.333***	0.323***
		(-1.78)	(-2.16)	(-0.32)	(-0.78)	(3.05)	(2.94)
LEV		-1.004***	-0.976***	-1.259***	-1.230***	0.116	0.125
		(-3.30)	(-3.21)	(-4.27)	(-4.18)	(0.43)	(0.47)
AGE		0.084***	0.084***	0.087***	0.087***	-0.073	-0.070
		(14.49)	(14.51)	(15.25)	(15.32)	(-0.09)	(-0.09)
Q		-0.043	-0.048	-0.029	-0.034	-0.024	-0.026
		(-1.23)	(-1.37)	(-0.94)	(-1.08)	(-0.96)	(-1.03)
ROA		1.247***	1.201***	0.996***	0.956***	0.084	0.081
		(5.61)	(5.38)	(4.67)	(4.48)	(0.51)	(0.49)
CASH		-0.139	-0.188	-0.161	-0.216	-0.190	-0.200
		(-0.36)	(-0.49)	(-0.44)	(-0.58)	(-0.59)	(-0.62)
R&D		1.619*	1.505	2.402**	2.284**	1.606*	1.598*
		(1.75)	(1.62)	(2.39)	(2.26)	(1.67)	(1.66)
CAPEX		1.063	1.098	-1.476	-1.500	-0.821	-0.853
		(0.76)	(0.78)	(-1.19)	(-1.21)	(-0.98)	(-1.02)
PPE		-0.539	-0.552	1.021*	1.011*	0.966	0.964
		(-1.26)	(-1.29)	(1.93)	(1.91)	(1.57)	(1.57)
N_ANA		0.008	0.010	-0.011	-0.010	0.008	0.008

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	(1)	(2)	(3)	(4)	(5)	(6)
	(0.66)	(0.75)	(-0.84)	(-0.74)	(0.72)	(0.69)
Dividend	0.344	0.354	0.881	0.888	0.394	0.383
	(0.54)	(0.56)	(1.45)	(1.46)	(0.84)	(0.82)
VOL	-1.380***	-1.439***	-1.166***	-1.224***	-0.861***	-0.868***
	(-4.59)	(-4.78)	(-4.18)	(-4.39)	(-4.58)	(-4.61)
Year FE	Y	Y	Y	Y	Y	Y
Industry FE	N	N	Y	Y	N	N
Firm FE	N	N	N	N	Y	Y
N	22281	22281	22271	22271	21892	21892
adj. R-sq	0.229	0.229	0.322	0.322	0.755	0.755

Table 21: Decomposing the board diversity index
This table shows the results of multivariate regressions using components of the board diversity index as dependent variable. Each component in Column (1) to (7) is normalized. $Bachelor = -STDZ(HHI\_BACHELOR)$ and $FinExpert = -STDZ(HHI\_FINEXPERT)$ All independent variables are lagged by one year. Standard errors are clustered at the firm-level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1) Gender	(2) Culture	(3) Foreign	(4) Age	(5) TimeBD	(6) Bachelor	(7) FinExpert
FIO_DIV	0.008**	0.010**	0.005	-0.000	0.004	-0.002	0.003
	(2.11)	(2.28)	(1.33)	(-0.01)	(1.14)	(-0.52)	(0.77)
DIO_DIV	0.002	-0.003	0.007	0.026*	-0.006	0.008	-0.015
	(0.21)	(-0.23)	(0.64)	(1.90)	(-0.54)	(0.60)	(-1.17)
FIO	0.869***	0.814**	0.937***	-1.213***	-0.525**	-0.167	-0.755**
	(3.12)	(2.38)	(2.90)	(-3.63)	(-1.97)	(-0.51)	(-2.52)
DIO	0.168**	-0.035	-0.109	-0.233***	-0.077	-0.158**	-0.202***
	(2.55)	(-0.42)	(-1.53)	(-3.38)	(-1.34)	(-2.06)	(-2.93)
N_BD	0.006	0.002	0.013**	0.033***	0.012**	-0.009	-0.021***
	(1.29)	(0.26)	(2.40)	(5.60)	(2.41)	(-1.39)	(-3.83)
IND_BD	0.117	0.191*	0.150	-0.044	-0.283***	1.079***	0.439***
	(1.37)	(1.86)	(1.62)	(-0.47)	(-3.48)	(11.11)	(5.10)
IF_CEO	-0.007	0.026	0.018	-0.100***	-0.022	-0.040	-0.012
	(-0.37)	(1.08)	(0.88)	(-4.19)	(-1.10)	(-1.60)	(-0.59)
FXSALES	0.081	0.143	0.099	0.055	0.001	0.126	0.065
	(1.09)	(1.36)	(0.99)	(0.59)	(0.01)	(1.32)	(0.74)
N_SEGM	0.000	-0.000	0.002	0.010	0.014**	-0.011	-0.003
	(0.07)	(-0.01)	(0.26)	(1.55)	(2.25)	(-1.34)	(-0.56)
Controls	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y
N	21892	21892	21892	21892	21892	21892	21892
adj. R-sq	0.732	0.689	0.744	0.628	0.810	0.605	0.667

Table 22: Restricted board diversity index
This table shows the results of multivariate regressions of restricted board diversity index. The dependent variable in Column (1) to (7) is the board diversity index excluding each normalized component. All independent variables are lagged by one year. Standard errors are clustered at the firm-level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1) excl. Gender	(2) excl. Culture	(3) excl. Foreign	(4) excl. Age	(5) excl. TimeBD	(6) excl. Bachelor	(7) excl. FinExpert
FIO_DIV	0.022	0.025**	0.024*	0.029**	0.017*	0.028**	0.026*
	(1.62)	(2.03)	(1.92)	(2.28)	(1.77)	(2.11)	(1.92)
DIO_DIV	0.015	0.018	0.012	-0.004	0.031	0.021	0.005
	(0.43)	(0.55)	(0.37)	(-0.11)	(1.33)	(0.65)	(0.15)
FIO	-0.515	-0.268	-0.548	1.686	2.263**	-0.002	-0.447
	(-0.39)	(-0.22)	(-0.45)	(1.40)	(2.56)	(-0.00)	(-0.34)
DIO	-0.458*	-0.151	-0.182	-0.034	-0.006	-0.392	-0.504*
	(-1.68)	(-0.61)	(-0.72)	(-0.13)	(-0.03)	(-1.48)	(-1.89)
N_BD	0.216***	0.210***	0.210***	0.187***	0.179***	0.135***	0.200***
	(8.90)	(9.12)	(8.99)	(8.14)	(10.82)	(5.65)	(8.30)
IND_BD	-2.294***	-2.301***	-2.322***	-2.128***	-1.146***	-1.158***	-1.706***
	(-6.26)	(-6.69)	(-6.72)	(-6.10)	(-4.65)	(-3.22)	(-4.66)
IF_CEO	-0.095	-0.119	-0.120	0.007	-0.023	-0.149*	-0.116
	(-1.04)	(-1.36)	(-1.35)	(0.08)	(-0.41)	(-1.69)	(-1.27)
FXSALES	0.211	0.073	0.196	0.233	0.291	0.391	0.363
	(0.59)	(0.22)	(0.59)	(0.69)	(1.12)	(1.12)	(1.03)
N_Segment	0.078***	0.080***	0.077***	0.068***	0.029*	0.066**	0.075***
	(2.77)	(3.12)	(2.98)	(2.63)	(1.67)	(2.45)	(2.75)
Controls	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y
N	21892	21892	21892	21892	21892	21892	21892
adj. R-sq	0.749	0.762	0.759	0.774	0.688	0.752	0.762

Table 23: Decomposing the ownership diversity index
This table shows the results of multivariate regressions on components of the ownership diversity index. The dependent variable is the board diversity index. In Column (1) to (4), the variable of interest is each normalized component of the ownership diversity index, respectively. FIO_CUL_DIS is the average cultural distance between each two institutional owners. $FIO\_DIV\_CTY = -FIO\_HHI\_CTY$, is the negative value of the HHI of foreign ownership country concentration. $FIO\_DIV\_TYPE = -FIO\_HHI\_TYPE$, is the negative value of the HHI of foreign ownership type concentration. $DIO\_DIV = --DIO\_HHI\_TYPE$, domestic ownership diversity is the negative value of the HHI of domestic ownership type concentration. All independent variables are lagged by one year. Standard errors are clustered at the firm-level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
FIO_CUL_DIS	0.085**				0.094
	(2.30)				(1.57)
FIO_DIV_CTY		0.073*			-0.022
		(1.81)			(-0.31)
FIO_DIV_TYPE			0.036		0.025
			(1.08)		(0.69)
DIO_DIV				0.024	0.020
				(0.48)	(0.41)
FIO	0.416	0.297	0.050	-0.142	0.466
	(0.32)	(0.23)	(0.04)	(-0.11)	(0.36)
DIO	-0.261	-0.270	-0.232	-0.193	-0.266
	(-0.97)	(-1.00)	(-0.87)	(-0.73)	(-0.98)
N_Board	0.220***	0.220***	0.220***	0.220***	0.220***
	(8.96)	(8.96)	(8.96)	(8.96)	(8.96)
Ind_Board	-2.151***	-2.151***	-2.158***	-2.150***	-2.159***
	(-5.88)	(-5.87)	(-5.90)	(-5.87)	(-5.90)
IF_CEO	-0.094	-0.094	-0.093	-0.093	-0.093
	(-1.04)	(-1.04)	(-1.02)	(-1.02)	(-1.03)
FXSALES	0.290	0.295	0.292	0.291	0.285
	(0.80)	(0.82)	(0.81)	(0.81)	(0.79)
N_Segment	0.078***	0.078***	0.078***	0.078***	0.078***
	(2.85)	(2.86)	(2.87)	(2.87)	(2.85)
Controls	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y
N	21892	21892	21892	21892	21892
adj. R-sq	0.755	0.755	0.755	0.755	0.755

Table 24: Restricted ownership diversity index
This table shows the results of multivariate regressions of restricted ownership diversity index. The dependent variable is the board diversity index. In Column (1) to (3), the variable of interest is foreign ownership diversity index excluding each normalized component, respectively. FIO_CUL_DIS is the average cultural distance between each two institutional owners. $FIO\_DIV\_CTY = -FIO\_HHI\_CTY$, is the negative value of the HHI of foreign ownership country concentration. $FIO\_DIV\_TYPE = -FIO\_HHI\_TYPE$, is the negative value of the HHI of foreign ownership type concentration. $DIO\_DIV = --DIO\_HHI\_TYPE$, domestic ownership diversity is the negative value of the HHI of domestic ownership type concentration. All independent variables are lagged by one year. Standard errors are clustered at the firm-level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
excl. FIO_CUL_DIS	0.032*		
	(1.65)		
excl. FIO_DIV_CTY		0.043**	
		(2.06)	
excl. FIO_DIV_TYPE			0.038**
			(2.14)
DIO_DIV	0.017	0.017	0.017
	(0.50)	(0.48)	(0.48)
FIO	0.196	0.342	0.335
	(0.15)	(0.26)	(0.26)
DIO	-0.272	-0.281	-0.276
	(-0.99)	(-1.03)	(-1.02)
N_Board	0.223***	0.223***	0.223***
	(8.97)	(8.97)	(8.97)
Ind_Board	-2.176***	-2.179***	-2.169***
	(-5.89)	(-5.90)	(-5.87)
IF_CEO	-0.102	-0.102	-0.103
	(-1.12)	(-1.11)	(-1.13)
FXSALES	0.294	0.291	0.294
	(0.81)	(0.80)	(0.81)
N_Segment	0.079***	0.079***	0.079***
	(2.87)	(2.86)	(2.86)
Controls	Y	Y	Y
Year FE	Y	Y	Y
Firm FE	Y	Y	Y
N	21892	21892	21892
adj. R-sq	0.752	0.752	0.752

Table 25: Identification: Instrumental variable
This table reports the 2SLS regressions of board diversity index (BD_DIV) on foreign ownership diversity, using FTSE index membership ($FTSE$) as instrumental variable. In Column (1) and (2), FIO_DIV is the original foreign ownership diversity index. In Column (3) and (4), FIO_DIV is the ordinal variable from 1 to 3, indicating the lowest to highest tertile of foreign ownership diversity index, respectively. All independent variables are lagged by one year. Standard errors are clustered at the firm-level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1) First stage	(2) Second stage	(3) First stage	(4) Second stage
	FIO_DIV	BD_DIV	FIO_DIV *(Ordinal)*	BD_DIV
FTSE	0.323***		0.187***	
	(5.78)		(7.14)	
FIO_DIV		1.395**		2.402***
		(2.57)		(2.64)
DIO_DIV	0.103***	-0.113	0.022**	-0.022
	(3.80)	(-1.37)	(2.30)	(-0.39)
FIO	-17.568***	24.234**	-6.798***	16.058**
	(-24.78)	(2.50)	(-26.57)	(2.51)
DIO	2.742***	-3.891***	0.630***	-1.592**
	(19.71)	(-2.58)	(12.81)	(-2.53)
N_BD	0.010	0.208***	0.004	0.212***
	(0.97)	(7.19)	(0.96)	(8.10)
IND_BD	0.325**	-2.605***	0.239***	-2.703***
	(1.98)	(-5.45)	(3.73)	(-5.85)
IF_CEO	0.009	-0.097	-0.001	-0.082
	(0.24)	(-0.91)	(-0.08)	(-0.83)
FXSALES	0.076	0.186	0.130**	-0.015
	(0.48)	(0.45)	(2.17)	(-0.04)
N_Segment	0.015	0.053*	0.005	0.063**
	(1.44)	(1.68)	(1.08)	(2.13)
F-stats	*34.92*		*53.73*	
Controls	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
N	21892	21896	21892	21896
adj. R-sq	0.653		0.562	

Table 26: DiD: Univariate tests
This table reports the univariate test results of DiD tests using the stock inclusion in FTSE All-World Index as a quasi-natural experiment. The treatment group are firms that are included in FTSE index from 2001 to 2019. The control group are firms matched using propensity score matching algorithm based on firm-level varaibles one year prior to the event. The DiD approach is to compare the board diversity of treatment group and control group 3 years before the event and 3 years after the event. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

Panel A: T-tests for pre-event trend				
	Treated	Control	Difference	t-stats
BD_DIV	0.893	0.882	0.011	0.09
Growth_BD_DIV	0.225	0.277	-0.052	-0.68
Panel B: DiD univariate test				
	Pre-event Treated - Control	Post-event Treated - Control	Dif-in-Dif	t-stats
BD_DIV	0.011	0.509***	0.498***	5.32

Table 27: DiD: Multivariate tests
This table reports regression results of DiD tests using the stock inclusion in FTSE All-World Index as a quasi-natural experiment. The dependent variable in Column (1) is foreign ownership diversity (FIO_DIV). The dependent variable in Column (2) is board diversity (BD_DIV). The treatment group are firms being included in FTSE index from 2001 to 2019. The control group are firms matched using propensity score matching algorithm based on firm-level variables one year prior to the event. The DiD approach is to compare the board diversity of treatment group and control group 3 years before the event and 3 years after the event. All independent variables are lagged by one year. Standard errors are clustered at the firm-level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1) FIO_DIV	(2) BD_DIV
TREAT*POST	0.301**	0.310*
	(2.56)	(1.83)
DIO_DIV	0.063	-0.079
	(0.74)	(-1.04)
FIO	-12.772***	0.814
	(-9.70)	(0.46)
DIO	1.843***	0.246
	(5.13)	(0.53)
N_BD	-0.019	0.113***
	(-0.91)	(3.63)
IND_BD	0.043	-0.646
	(0.11)	(-1.22)
IF_CEO	-0.025	-0.272**
	(-0.28)	(-2.15)
FXSALES	-0.138	0.853*
	(-0.46)	(1.67)
N_Segment	0.009	0.027
	(0.41)	(1.04)
Controls	Y	Y
Year FE	Y	Y
Event year FE	Y	Y
Firm FE	Y	Y
N	2858	2809
adj. R-sq	0.593	0.790

Table 28: Board diversity and corporate innovation
This table shows the results of regressions testing the effect of board diversity on corporate innovation. The dependent variable is the logarithm of 1 plus the number of patent counts (*Patent*). *BD_DIV* is the multidimensional board diversity measure. Column (1) and (2) are OLS regressions using year fixed effect and industry and year fixed effects, respectively. Column (3) and (4) are 2SLS regressions using the population diversity of the county where the firm is headquartered (*COUNTY_DIV*). All independent variables are lagged by one year. Standard errors are clustered at the firm-level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
	OLS	OLS	First stage	Second stage
	Patent	Patent	BD_DIV	Patent
BD_DIV	0.009**	0.013**		0.358*
	(2.14)	(2.00)		(1.75)
COUNTY_DIV			0.117***	
			(2.90)	
FIO	1.143***	3.462***	6.361***	1.269
	(4.06)	(6.76)	(5.88)	(0.89)
DIO	0.144**	-0.150*	-0.783***	0.117
	(2.54)	(-1.87)	(-4.06)	(0.60)
SALES	0.128***	0.379***	0.524***	0.197*
	(6.83)	(17.83)	(14.38)	(1.77)
LEV	0.005	-0.069	-0.466**	0.101
	(0.08)	(-0.79)	(-2.30)	(0.68)
Q	-0.037***	0.022*	0.004	0.020
	(-5.33)	(1.94)	(0.17)	(1.46)
ROA	0.014	-0.093	0.023	-0.102
	(0.35)	(-1.33)	(0.14)	(-1.14)
R&D	0.680**	4.086***	2.869***	3.109***
	(2.54)	(10.23)	(3.30)	(4.21)
CAPEX	-0.454***	0.264	-1.436	0.798
	(-2.63)	(0.74)	(-1.53)	(1.48)
PPE	0.225*	0.181	-0.107	0.221
	(1.75)	(1.14)	(-0.29)	(1.09)
FCF	-0.132	-0.018	0.153	-0.071
	(-1.38)	(-0.09)	(0.37)	(-0.29)
Year FE	Y	Y	Y	Y
Industry FE	N	Y	Y	Y
Firm FE	Y	N	N	N
F-stats			*45.36*	
N	19282	19654	19654	19654
adj. R-sq	0.897	0.548	0.193	

Table 29: The effects of proxy access
This table shows the results of regressions testing the effects of proxy access on the baseline results (Table 20). The dependent variable is board diversity (BD_DIV). IF_PROXY is a dummy variable, which equals 1 if the firm has adopted the rule at t, and 0 otherwise. In Column (1) to (3), FIO_DIV is the original variable. In Column (4) to (6), FIO_DIV is the ordinal variable, from 1 to 3, indicating the lowest to highest tertile of foreign ownership diversity index, respectively. All independent variables are lagged by one year. Standard errors are clustered at the firm-level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Original variable FIO_DIV			*Ordinal variable FIO_DIV*		
FIO_DIV*IF_PROXY	-0.169	-0.173	0.038	-0.572*	-0.585*	-0.257
	(-1.07)	(-1.08)	(0.24)	(-1.70)	(-1.80)	(-0.85)
FIO_DIV	0.128***	0.124***	0.032**	0.264***	0.254***	0.076**
	(4.82)	(5.09)	(2.06)	(4.08)	(4.41)	(2.01)
IF_PROXY	0.004	0.191	-0.335	1.084	1.301	0.458
	(0.01)	(0.38)	(-0.70)	(1.11)	(1.38)	(0.54)
DIO_DIV	-0.275***	-0.234***	0.020	-0.264***	-0.224***	0.022
	(-3.79)	(-3.54)	(0.41)	(-3.65)	(-3.38)	(0.44)
FIO	6.659***	5.466***	0.546	6.170***	4.942***	0.413
	(4.16)	(3.67)	(0.42)	(3.84)	(3.30)	(0.32)
DIO	-1.215***	-1.168***	-0.303	-1.034***	-0.988***	-0.261
	(-4.14)	(-4.14)	(-1.12)	(-3.66)	(-3.63)	(-0.98)
N_BD	0.225***	0.213***	0.222***	0.226***	0.214***	0.222***
	(7.45)	(7.52)	(9.08)	(7.47)	(7.53)	(9.10)
IND_BD	-4.796***	-3.995***	-2.174***	-4.819***	-4.024***	-2.182***
	(-10.09)	(-9.05)	(-5.95)	(-10.12)	(-9.09)	(-5.97)
IF_CEO	-0.055	0.024	-0.094	-0.051	0.028	-0.095
	(-0.47)	(0.22)	(-1.04)	(-0.43)	(0.25)	(-1.05)
FXSALES	0.771***	1.286***	0.293	0.777***	1.295***	0.291
	(2.98)	(4.30)	(0.81)	(3.00)	(4.32)	(0.81)
N_Segment	0.027	0.070**	0.078***	0.027	0.069**	0.078***
	(0.81)	(2.18)	(2.85)	(0.81)	(2.16)	(2.87)
Controls	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Industry FE	N	Y	N	N	Y	N
Firm FE	N	N	Y	N	N	Y
N	22281	22271	21892	22281	22271	21892
adj. R-sq	0.230	0.322	0.755	0.229	0.322	0.755

Table 30: Proxy access: decomposing the board diversity index
This table shows the results of regressions testing the effects of proxy access for different components of board diversity index. In Column (1), (2) and (3), the dependent variable is gender ratio ($STDZ(PCT\_FEMALE)$). In Column (4), (5) and (6), the dependent variable is percentage of foreign directors on board ($STDZ(PCT\_FOREIGN)$). In Column (7), (8) and (9), the dependent variable is board educational background diversity ($Bachelor = -STDZ(HHI\_BACHELOR)$). IF_PROXY is a dummy variable, which equals 1 if the firm has adopted the rule at t, and 0 otherwise. All independent variables are lagged by one year. Standard errors are clustered at the firm-level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1) Gender	(2) Gender	(3) Gender	(4) Foreign	(5) Foreign	(6) Foreign	(7) Bachelor	(8) Bachelor	(9) Bachelor
FIO_DIV*IF_PROXY	0.095***	0.062*	0.064**	-0.140**	-0.149**	0.060	0.092**	0.090**	0.010
	(2.72)	(1.94)	(2.03)	(-2.15)	(-2.32)	(1.40)	(2.41)	(2.47)	(0.26)
FIO_DIV	0.017***	0.009	0.007**	0.007	0.010	0.005	0.002	0.005	-0.002
	(2.86)	(1.62)	(1.99)	(1.00)	(1.63)	(1.23)	(0.26)	(0.86)	(-0.54)
IF_PROXY	-0.223**	-0.079	-0.023	0.205	0.251	-0.189	-0.263**	-0.285***	-0.016
	(-2.23)	(-0.88)	(-0.23)	(1.03)	(1.32)	(-1.54)	(-2.46)	(-2.74)	(-0.14)
DIO_DIV	0.030*	0.010	0.003	0.044**	0.044***	0.007	-0.027	-0.024	-0.008
	(1.86)	(0.68)	(0.23)	(2.41)	(2.64)	(0.64)	(-1.64)	(-1.59)	(-0.60)
FIO	0.873**	0.442	0.822***	2.420***	1.854***	0.970***	0.558	0.689*	0.165
	(2.37)	(1.38)	(2.95)	(4.86)	(3.99)	(2.99)	(1.42)	(1.85)	(0.50)
DIO	-0.041	-0.016	0.183***	-0.473***	-0.463***	-0.112	0.164**	0.102	0.159**
	(-0.56)	(-0.24)	(2.77)	(-5.88)	(-5.68)	(-1.55)	(2.40)	(1.48)	(2.07)
N_BD	0.075***	0.055***	0.005	0.020***	0.013**	0.014**	-0.014**	-0.010	0.009
	(11.91)	(9.62)	(1.06)	(3.00)	(2.02)	(2.41)	(-2.11)	(-1.51)	(1.38)
IND_BD	0.523***	0.465***	0.125	0.073	0.023	0.149	-1.364***	-1.323***	-1.078***
	(5.01)	(5.02)	(1.48)	(0.65)	(0.21)	(1.61)	(-11.74)	(-12.01)	(-11.13)
IF_CEO	-0.009	-0.003	-0.006	0.021	0.041	0.018	0.106***	0.097***	0.041
	(-0.36)	(-0.13)	(-0.31)	(0.71)	(1.40)	(0.88)	(3.87)	(3.70)	(1.60)
FXSALES	-0.387***	-0.088	0.077	0.858***	0.906***	0.099	-0.040	-0.076	-0.127
	(-6.96)	(-1.44)	(1.04)	(10.38)	(9.56)	(0.99)	(-0.66)	(-1.03)	(-1.33)
N_Segment	0.007	0.011*	0.000	0.002	0.001	0.002	-0.005	-0.011	0.010
	(0.94)	(1.71)	(0.04)	(0.19)	(0.10)	(0.23)	(-0.69)	(-1.59)	(1.34)
	(0.94)	(1.71)	(0.04)	(0.19)	(0.10)	(0.23)	(0.69)	(1.59)	(-1.34)
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	N	Y	N	N	Y	N	N	Y	N
Firm FE	N	N	Y	N	N	Y	N	N	Y
N	22281	22271	21892	22281	22271	21892	22281	22271	21892
adj. R-sq	0.226	0.350	0.733	0.110	0.185	0.744	0.115	0.197	0.605

Table 31: Proxy access: decomposing the ownership diversity index
This table shows the results of regressions of testing the effects of proxy access for different components of ownership diversity index. The dependent variable is board diversity. Column (1), (2) and (3) test foreign ownership cultural diversity (FIO_CUL_DIS). Column (4), (5) and (6) test foreign ownership country diversity (FIO_DIV_CTY). Column (7), (8) and (9) test foreign ownership type diversity (FIO_DIV_TYPE). IF_PROXY is a dummy variable, which equals 1 if the firm has adopted the rule at t, and 0 otherwise. All independent variables are lagged by one year. Standard errors are clustered at the firm-level and t-statistics are reported in parentheses. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FIO_CUL_DIS*IF_PROXY	0.339	0.165	0.266						
	(0.93)	(0.47)	(0.70)						
FIO_DIV_CTY*IF_PROXY				-0.087	-0.229	0.062			
				(-0.19)	(-0.50)	(0.12)			
FIO_DIV_TYPE*IF_PROXY							-1.085***	-0.870***	-0.164
							(-3.29)	(-2.72)	(-0.53)
FIO_CUL_DIS	0.213***	0.224***	0.080**						
	(3.43)	(3.94)	(2.19)						
FIO_DIV_CTY				0.320***	0.299***	0.072*			
				(4.57)	(4.65)	(1.77)			
FIO_DIV_TYPE							0.233***	0.216***	0.039
							(4.08)	(4.21)	(1.16)
IF_PROXY	-0.753*	-0.403	-0.494	-0.344	-0.042	-0.290	0.306	0.341	-0.126
	(-1.67)	(-0.92)	(-1.06)	(-0.72)	(-0.09)	(-0.56)	(0.81)	(0.94)	(-0.39)
DIO_DIV	-0.269***	-0.230***	0.020	-0.272***	-0.232***	0.021	-0.268***	-0.227***	0.022
	(-3.71)	(-3.47)	(0.40)	(-3.76)	(-3.50)	(0.42)	(-3.71)	(-3.42)	(0.44)
FIO	5.940***	4.859***	0.516	6.333***	5.124***	0.394	5.881***	4.598***	0.133
	(3.73)	(3.28)	(0.40)	(3.95)	(3.45)	(0.31)	(3.72)	(3.12)	(0.10)
DIO	-1.016***	-0.991***	-0.270	-1.176***	-1.121***	-0.286	-1.081***	-1.025***	-0.249
	(-3.56)	(-3.60)	(-1.01)	(-4.01)	(-3.97)	(-1.06)	(-3.76)	(-3.72)	(-0.93)
N_BD	0.225***	0.213***	0.222***	0.224***	0.212***	0.222***	0.229***	0.217***	0.222***
	(7.45)	(7.51)	(9.07)	(7.42)	(7.50)	(9.08)	(7.57)	(7.63)	(9.09)
IND_BD	-4.790***	-3.991***	-2.168***	-4.787***	-3.984***	-2.166***	-4.787***	-3.998***	-2.175***
	(-10.05)	(-9.00)	(-5.94)	(-10.07)	(-9.01)	(-5.93)	(-10.05)	(-9.03)	(-5.96)
IF_CEO	-0.058	0.023	-0.096	-0.057	0.024	-0.095	-0.051	0.026	-0.094
	(-0.49)	(0.21)	(-1.06)	(-0.49)	(0.22)	(-1.05)	(-0.44)	(0.24)	(-1.04)
FXSALES	0.783***	1.297***	0.289	0.785***	1.299***	0.297	0.785***	1.299***	0.294
	(3.03)	(4.33)	(0.80)	(3.04)	(4.34)	(0.82)	(3.04)	(4.34)	(0.82)
N_Segment	0.027	0.070**	0.078***	0.027	0.070**	0.078***	0.029	0.071**	0.079***
	(0.82)	(2.18)	(2.85)	(0.81)	(2.18)	(2.85)	(0.87)	(2.21)	(2.88)
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	N	Y	N	N	Y	N	N	Y	N
Firm FE	N	N	Y	N	N	Y	N	N	Y
N	22281	22271	21892	22281	22271	21892	22281	22271	21892
adj. R-sq	0.228	0.322	0.755	0.229	0.322	0.755	0.229	0.322	0.755

4.10 Appendix

Table A3: Variable definitions

Varaible	Definition
PCT_FEMALE	Percentage of female directors on board (BoardEx)
SD_AGE	Standard deviation of the age of the board members (BoardEx)
PCT_FOREIGN	Percentage of foreign directors on board (BoardEx)
BD_CUL_DIS	Average of the culture distance between each two members on board (BoardEx, Hofstede's cultural dimensions)
SD_TIMEBD	Stardard deviation of the time on board of all the members (BoardEx)
HHI_BACHELOR	Herfindahl index of the number of directors that are classified in categories by their bachelor's institution (BoardEx)
HHI_FINEXPERT	Herfindahl index of the number of directors that are classified as having financial expertise or not (BoardEx)
FIO_CUL_DIS	Average of the culture distance between each two foreign institutional investors (FactSet, Hofstede's cultural dimensions)
FIO_HHI_CTY	Herfindahl index of foreign institutional ownership that are classified in categories by their institution's domicile (FactSet)
FIO_HHI_TYPE	Herfindahl index of foreign institutional ownership that are classified in categories by their institution's type (FactSet)
DIO_HHI_TYPE	Herfindahl index of domestic institutional ownership that are classified in categories by their institution's type (FactSet)
FIO	Shares owned by foreign institutions divided by total shares outstanding (FactSet)
DIO	Shares owned by domestic institutions divided by total shares outstanding (FactSet)
BD_SIZE	Number of directors on board (BoardEx)
BD_INDP	Percentage of independent directors on board (BoardEx)
IF_CEO	Dummy variable equals 1 if CEO is the chairman on Board
FXSALES	Exports and sales generated abroad divided by total sales (Compustat)
N_SEGM	Number of segments that a firm operates (Compustat)
SIZE	Log of total assets (Compustat AT)
LEV	Total debt (Compustat DLTT + DLC) divided by assets (Compustat AT)
AGE	Number of years since the firm's IPO (Compustat)
Q	Market value of assets (Compustat DLTT + DLC + csho * prcc_f + TXDITC) divided by the book value of assets (Compustat AT)
ROA	Net income (Compustat NI) divided by assets (Compustat AT)
CASH	Cash and marketable securities (Compustat CHE) divided by assets (Compustat AT)
R&D	R&D (Compustat XRD) divided by assets (Compustat AT). If missing, R&D is set equal to 0.
CAPEX	Capital expenditures (Compustat CAPX) divided by assets (Compustat AT)
PPE	Property, plant, and equipment (Compustat PPENT) divided by assets (Compustat AT)
Dividend	Dividends (Compustat DVT) divided by operation income before depreciation (Compustat OIBDP) ; set to 0 if negative and to missing if OIBDP <0
VOL	Square root of 252 multiplied by the standard deviation of daily stock return (CRSP)
N_ANS	Number of analysts covering a firm (I/B/E/S)

5 Conclusion

The notion of diversity has attracted much attention of researchers in many disciplines. Promoting diversity could help us deal with some biggest challenges in the world today, for example, climate changes and social inequality. In business and management, beside providing justice and fairness, diversity of the top management team, the board of directors and the workforce has been shown to improve different firm outcomes.

This thesis complements and contributes to this board literature by investigating the impact of the diversity of foreign institutional investors on firms. Foreign institutional investors are heterogeneous in many dimensions and affect the invested firm differently. The first essay suggests that there are not necessarily "good" or "bad" foreign investors but an optimal fit between foreign investors and investees: the industry expertise of foreign institutional investors could benefit the invested firm in the common industry. The second essay studies the interplay among foreign institutional investors and shows that the diversity of foreign investors positively affects the diversity of the board of directors. Their contribution to board diversity could improve corporate innovation.

Both essays highlight the importance of foreign institutional investors and their diversity. One should not differentiate foreign institutional investors only based on their country of origin or holdings, but also take account of firms' own characteristics. At the same time, countries that open up to foreign investment are likely to reap benefits from this policy decision. In other words, "diversity and inclusion" of foreign institutional investors is also beneficial for the real economy.

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