Are foreign investors locusts?
The long-term effects of foreign institutional ownership*

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Abstract

This paper challenges the view that foreign investors lead firms to adopt a short-term orientation and forgo long-term investment. Using a comprehensive sample of publicly listed firms in 30 countries over the period 2001–2010, we find instead that greater foreign institutional ownership fosters long-term investment in tangible, intangible, and human capital. Foreign institutional ownership also leads to significant increases in innovation output. We identify these effects by exploiting the exogenous variation in foreign institutional ownership that follows the addition of a stock to the MSCI indexes. Our results suggest that foreign institutions exert a disciplinary role on entrenched corporate insiders worldwide.

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

– Franz Müntefering, German Social Democratic Party chairman, 2005

"The effects of the short-termist phenomenon are troubling... In the face of these pressures, more and more corporate leaders have responded with actions that can deliver immediate returns to shareholders, such as buybacks or dividend increases, while underinvesting in innovation, skilled workforces or essential CAPEX necessary to sustain long-term growth."

– Laurence Fink, CEO, BlackRock, 2015

1. Introduction

How does financial globalization affect long-term corporate investment and productivity? In recent decades, companies have trended away from the stakeholder capitalism model of concentrated ownership historically predominant in continental Europe and Japan, in which long-term relationships with labor, creditors, and other stakeholders are promoted (Tirole, 2001; Carlin and Mayer, 2003; Allen, Carletti, and Marquez, 2015). Instead, many companies are moving toward the Anglo-Saxon shareholder capitalism model, with its dispersed and globalized shareholder structure. Foreign institutional investors are agents in this change, playing an increasingly prominent monitoring role as shareholders worldwide (Aggarwal, Erel, Ferreira, and Matos, 2011).

In this paper, we examine two hypotheses. The first hypothesis is that the presence of foreign institutional investors as shareholders can lead managers to cut long-term investment by reducing capital expenditures, research and development (R&D) expenditures, and employment. This view posits that foreign portfolio flows represent "hot money" in search of short-term profits, with little concern for long-term firm prospects.[1] Regulators and policy makers have expressed concerns that the rising importance of activist investors is leading firms toward short-termist strategies, delivering immediate returns to shareholders at the expense of long-term investment (Organisation

[1] Brennan and Cao (1997) argue that foreign investors, less informed about the prospects of local stocks, may rebalance portfolios disproportionally and amplify the stock reaction to negative public news. Borensztein and Gelos (2003) suggest that international capital flows are more "panic-prone" in emerging markets.

for Economic Co-Operation and Development, 2015). In one high-profile case, Franz Müntefering, German Social Democratic Party chairman, compared foreign private equity and activist hedge fund investors targeting German companies to an invasion of "locusts" stripping companies bare.[2] The "locust" label has since been used to refer to foreign investors more broadly (Benoit, 2007; The Economist, 2007). Locust foreign capital, it is proposed, could lead companies to strip assets for short-term profits, delocalize production, and adopt unfriendly labor policies, including layoffs. This attitude is part of a more general phenomenon of protectionist sentiment with regard to foreign capital flows.[3]

Foreign institutional investors may create market pressure inducing short-termism if they prompt managers to prioritize short-term earnings over long-term growth. Ferreira, Manso, and Silva (2014) argue that the stock market pressures managers to select projects that they can easily communicate to investors; managers forgo innovation in favor of ready-made technologies, which are more transparent to investors. Foreign institutions, moreover, may be less tolerant of failure, which can place executives at greater risk for career concerns, including termination. These factors may steer risk-averse managers away from pursuing opportunities for innovative growth.

The second hypothesis is that foreign institutional investor monitoring promotes long-term investment in fixed capital, innovation, and human capital. This positive impact derives from the disciplinary effect of the presence of institutions on corporate insiders. Institutional investors may persuade managers, who tend to prefer a quiet life (Hart, 1983; Bertrand and Mullainathan, 2003), to innovate via diplomacy, actively voting their shares, or even confrontational proxy fights. In an international context, other corporate insiders, such as blockholders, may extract private benefits

[2] A prominent example is the bathroom hardware maker Grohe, which the U.S. private equity group TPG Capital took over in 2004. TPG Capital's original plans called for job cuts. However, Grohe subsequently invested in R&D, improved profitability, and reduced its labor force less than expected (Milne, 2008). Another case is Children's Investment Fund, a UK hedge fund, which helped block Deutsche Börse's attempt to buy the London Stock Exchange, arguing that buying back shares would be a better use of its cash (The Economist, 2005).

[3] Dinc and Erel (2013) find evidence of economic nationalism in mergers and acquisitions in Europe, in that governments prefer to see target companies remaining in domestic hands.

through control and may not be diversified, making them averse to risk.[4]

Foreign institutions may be in a better position than domestic institutional investors to monitor corporate insiders and influence strategic decision making. Domestic institutions, because they are more likely to have business ties with local companies, may have a closer relation with the firms they invest in. They may thus be more accommodating to corporate insiders and less effective as external monitors (Gillan and Starks, 2003; Ferreira and Matos, 2008).[5] In contrast, because they are less encumbered by ties with corporate insiders, foreign institutions can reduce managerial entrenchment and promote investment in riskier opportunities for growth. Foreign institutions may also be better able to tolerate the high-risk/high-return trade-off associated with long-term investment because they can better diversify risks through their international portfolios.[6]

To test our hypotheses, we use a comprehensive data set of portfolio equity holdings by institutional investors covering more than 30,000 publicly listed firms in 30 countries over the period 2001–2010. We find that higher ownership by foreign institutions leads to an increase in long-term investment (proxied by capital and R&D expenditures) and innovation output (proxied by patent counts). We also find that these increases in investment in tangible and intangible capital do not induce unfriendly labor policies. On the contrary, we find that higher foreign institutional ownership leads to increases in employment and measures of human and organization capital.

The endogeneity of foreign institutional ownership makes it difficult to establish a causal effect. In fact, foreign institutions may choose to invest in firms with better long-term growth prospects or in firms for which they anticipate a surge in innovation. We address the omitted variables concern using firm fixed effects that control for time-invariant unobserved firm heterogeneity. Further, we address reverse causality (and omitted variables) concerns using

[4] In an alternative to the voice channel, institutional investors can threaten to exit (e.g., selling and depressing stock prices). Our identification strategy using stock additions to the MSCI ACWI emphasizes the voice channel.
[5] Domestic institutional investors are often affiliated with banks that act as creditors, underwriters, advisors or hold seats on boards (Ferreira and Matos, 2012; Ferreira, Matos, and Pires, 2016).
[6] There are some markets that have witnessed the development of independent domestic institutions. For example, Giannetti and Laeven (2009) show that the reform of the pension system in Sweden increased investor monitoring, but only by independent private pension funds.

instrumental variables methods that isolate a plausibly exogenous variation in foreign institutional ownership. We exploit the fact that foreign institutions are more likely to invest in Morgan Stanley Capital International (MSCI) indexes' stocks, because international portfolios are typically benchmarked against these indexes (Cremers, Ferreira, Matos, and Starks, 2016). Our instrument for foreign institutional ownership is the stock additions (and deletions) to the MSCI All Country World Index (MSCI ACWI).

The first-stage results indicate that foreign institutions increase their holdings by nearly 3 percentage points of market capitalization when a firm's stock is added to the MSCI ACWI. Importantly, we find that domestic institutional ownership does not increase significantly when a firm's stock is added to the MSCI ACWI. This result suggests that stock additions do not affect our outcomes of interest through channels other than foreign institutional ownership (e.g., new information about firms' future prospects, investor recognition or attention, and changes in capital supply), and thus supports the validity of the exclusion restriction.

The second-stage results indicate that a 3 percentage point increase in foreign institutional ownership leads to a 0.3 percentage point increase in long-term investment (as a fraction of assets), a 12% increase in employment, and an 11% increase in innovation output. We obtain similar results when we restrict our sample to firms in the 10% bandwidth of the number of stocks around the cutoff that determines the inclusion in the MSCI ACWI.[7] Results are also consistent when we employ a difference-in-differences estimation around the stock addition events. We conclude that foreign institutional ownership has a positive effect on long-term investment, employment, and innovation, which is consistent with the monitoring hypothesis.

We also examine the impact of stock additions on firms' financial policies. Using difference-in-differences estimation, we find that the increase in financing needs due to the increase in long-term investment following stock additions to the MSCI ACWI is covered by a decrease in cash holdings and an increase in new debt issuance. Importantly, our results show that firms issue less

[7] The MSCI ACWI contains the largest firms and covers about 85% of the free float-adjusted market capitalization in each country.

equity, use less external financing, and use more internal financing after the inclusion of their shares in the MSCI ACWI, which is consistent with the pecking order theory of capital structure. These results mitigate the concern that the increase in long-term investment following the addition of a stock to the index is driven by an increase in the supply of capital, which may enable a firm to raise more external capital at a lower cost.

The evidence from stock additions suggests that indexed money managers play an active governance role and influence corporate policies. Appel, Gormley, and Keim (2016) and Crane, Michenaud, and Weston (2016) use stock additions into the Russell indexes as an identification strategy and find that passive investors (in a portfolio management sense) act as active investors (in a corporate governance sense) in the United States. In fact, Larry Fink, chairman of Blackrock, the world's largest (and mostly indexed) asset manager, sent a high-profile letter to chief executives asking them to "understand that corporate leaders' duty of care and loyalty is not to every investor or trader who owns their companies' shares at any moment in time, but to the company and its long-term owners."

We conduct several tests to examine whether foreign institutions increase long-term investment, employment, and innovation output through the monitoring channel. Using investors' portfolio turnover as a measure of investment horizon (Gaspar, Massa, and Matos, 2005; Harford, Kecskes, and Mansi, 2015), we find that long-term foreign institutional ownership has a stronger positive relation with the outcome variables than short-term foreign institutional ownership. To the extent that long-term investors have a greater incentive to monitor, this evidence supports the monitoring hypothesis. We also examine whether the country of origin of foreign institutional investors matters. We find a positive and statistically significant relation between the outcome variables and common law–based foreign institutional ownership. This result is consistent with foreign institutions from common law countries "exporting" good governance practices, providing further support for the monitoring hypothesis.

Next, we find a positive effect of foreign institutional ownership when firms have weaker corporate governance and when country-level investor protection is weaker. Further, we find a

positive relation between foreign institutional ownership and innovation output when competition in product markets is less intense (i.e., when managers are more entrenched). If corporate governance standards are weak or there is little competition, managers are not disciplined by such mechanisms as boards and the threat of takeover or bankruptcy, and there is more need for monitoring by foreign institutions. These results again support the monitoring channel. Overall, our findings suggest that foreign institutions act as effective monitors and persuade corporate insiders to pursue long-term projects instead of enjoying a quiet life.[8]

Last, we examine whether the presence of foreign institutions enhances firm value. Indeed, increases in long-term investment and innovation output could be symptoms of overinvestment or "empire building" (Jensen, 1986). To this end, we conduct additional tests using several measures of firm performance. We find that foreign institutional ownership is positively associated with total factor productivity, foreign sales, and shareholder value, suggesting that foreign ownership does not lead to overinvestment.

There is mixed evidence on the impact of institutional investors on long-term U.S. investment. Bushee (1998) finds that firms with larger institutional ownership are less likely to cut R&D expenditures to reverse a decline in earnings. Aghion, Van Reenen, and Zingales (2013) find that institutional ownership has a positive effect on innovation by mitigating managers' career concerns. Harford, Kecskes, and Mansi (2015) show that long-term institutional investors monitor managers and encourage firm policies that increase shareholder value and discourage overinvestment.

Previous research has also examined the effect of private equity and activist hedge funds on firm polices and performance. In a cross-country study, Bernstein, Lerner, Sørensen, and Strömberg (2016) show that industries that receive private equity investments grow faster in terms

[8] The evidence differs from the career concern hypothesis that explains the role of domestic institutions in corporate innovation in the United States (Aghion, Van Reenen, and Zingales, 2013). This may be due to the fact that other corporate insiders matter more in an international context, while domestic institutions represent the majority of institutional ownership in U.S. firms.

of output and employment.[9] The evidence is mixed with respect to activist hedge funds. Brav, Jiang, Ma, and Tian (2014) show that firms targeted by activists reduce R&D expenditures but increase innovation output, while Cremers, Giambona, Sepe, and Wang (2015) find that activism decreases long-term firm value, especially among more innovative firms. Using a cross-country sample, Becht, Franks, Grant, and Wagner (2016) find that the returns to hedge fund activism are economically important and that activists are more likely to engage targets with high foreign institutional ownership. We contribute to this literature by showing that foreign portfolio investors who hold minority stakes play an important role in monitoring firms worldwide. Overall, the evidence suggests that there is large heterogeneity in the effect of foreign owners on firm policies and performance.

Our paper is related to the literature on the role of stock markets in promoting or distorting manager incentives to pursue short-term performance at the expense of long-term performance. Stein (1988, 1989) discusses investor myopia and optimal managerial decision-making in irrational stock markets. Asker, Farre-Mensa, and Ljungqvist (2015) show that short-termism distorts investment and innovation decisions in U.S. public firms. However, Acharya and Xu (2015) find that public listing is beneficial to the innovation of firms in industries that are more dependent on external finance. Kaplan (2015) names the Internet, the fracking revolution, and the biotech booms of recent decades as evidence against the short-termist view of U.S. corporations that were part of a "failing capital investment system" (Porter, 1992). We contribute to this literature by studying the role of cross-border portfolio flows for long-term investment and innovation output.

Our paper also adds to recent international studies on innovation. Guadalupe, Kuzmina, and Thomas (2012) show that foreign direct investment has a positive impact on innovation in local firms through technology and know-how transfers. Hsu, Tian, and Xu (2014) find that equity

[9] In terms of U.S. private equity investors, Davis, Haltiwanger, Handley, Jarmin, Lerner, and Miranda (2014) show that leveraged buyouts bring modest net job losses and gains in productivity, while Lerner, Sørensen, and Strömberg (2011) show that buyout targets do not cut innovation activities.

market development positively affects innovation. In contemporaneous work, Luong, Moshirian, Nguyen, Tian, and Zhang (2016) find that foreign institutional investors enhance innovation but do not explore the implications for long-term investment and employment. Others examine the role of different stakeholders in the innovation process, such as blockholders, creditors, and workers. Hsu, Huang, Massa, and Zhang (2015) show that family ownership promotes innovation. Using country-level data, Acharya, Baghai, and Subramanian (2013) show that employee-friendly laws promote innovation, while Acharya and Subramanian (2009) show that creditor-friendly bankruptcy codes hinder innovation.

2. Data and variables

Our initial sample consists of a panel of publicly listed firms in the period 2001–2010 drawn from the Worldscope database. We exclude utilities (SIC codes 4900–4999) and financial firms (SIC codes 6000–6999) because these industries tend to be regulated. We further restrict the sample to firms based in the 30 countries in which publicly listed firms have, in total, at least ten patents over the sample period and $10 billion of stock market capitalization. The final sample consists of 30,952 unique firms for a total of 181,173 firm-year observations.

2.1. Long-term investment

In our main tests, we focus on the long-term investment in both tangible and intangible capital, which we proxy for by the sum of capital expenditures (CAPEX) and R&D expenditures. Panel A of Table 1 shows that our sample firms invested almost $16.3 trillion in fixed capital in 2001–2010. U.S. and non-U.S. firms have a similar average CAPEX-to-assets ratio at 5%. Panel B of Table 1 shows that the industries (using the Fama-French 12-industry classification) with the highest capital intensity are energy and telecoms.

Our data show that R&D expenditures are well distributed across regions in the world in our sample period. Panel A of Table 1 shows that our sample firms invested almost $4.7 trillion in R&D in 2001–2010. U.S. firms have the highest average R&D-to-assets ratio at 5.1%, far

exceeding the average of 1.5% for non-U.S. firms (we set R&D expenditures to zero for firms that do not report R&D).[10] Although U.S. firms lead in terms of R&D intensity, the combined R&D spending of non-U.S. firms exceeded that of U.S. firms over the sample period. This suggests an increased globalization of innovation activities. Panel B of Table 1 shows that the industries with the highest R&D intensity are healthcare, business equipment, and consumer durables.[11]

2.2. Human and organization capital

Along with investment in tangible and intangible capital, firms need to make long-term investments in human and organization capital. In this regard, the notion that foreign investors act as "locusts" is that they may push for strategies that are adverse to labor, such as delocalization of production or employee layoffs, as a way to boost short-term performance. To proxy for investment in human capital, we use the logarithm of the number of employees (*LABOR*), which has a wide coverage in Worldscope. For non-U.S. firms, we also use wage-based proxies: staff costs-to-sales ratio (*STAFF_COST*) and average staff costs per employee (*AV_STAFF_COST*). While *LABOR* and *STAFF_COST* measure the level of employment and labor costs, *AV_STAFF_COST* measures the relative importance of high- versus low-skill jobs. To proxy for investment in organization capital (Eisfeldt and Papanikolau, 2013), we use the ratio of selling, general, and administrative expenses to sales (*SG&A*).

2.3. Innovation output

We measure the output of firms' R&D activity by the number of patents, the exclusive rights over the invention of a product or a process. Researchers have argued that patent counts are the

[10] International Accounting Standard "IAS 38 Intangible Assets" defines the accounting requirements for investments in creating intangible assets such as R&D. Historically, there have been potential sample selection issues due to the voluntary nature of R&D disclosure and differences in national accounting standards. Hall and Oriani (2006) conclude that even though reporting R&D was not required in some countries in continental Europe, in fact, a fairly large share of major companies reported it. Additionally, in the second half of the 2000s, the transition by many firms to International Financial Reporting Standards (IFRS) has considerably improved R&D reporting practices. In the robustness section, we run our tests for the 2005–2010 post-IFRS adoption period.

[11] We provide more detailed statistics in the Internet Appendix. Panel A of Fig. IA.1 shows that CAPEX is well distributed worldwide, and Panel A of Fig. IA.2 shows a rise in the share of CAPEX of firms located in the Asia Pacific region during the 2000s. Panels B and C show similar patterns for R&D expenditures and patent counts.

most important measure of firms' innovation output (Griliches, 1990). While patent counts per se do not necessarily convey the economic value of underlying inventions, there is ample evidence of a positive relation between patents and firm value both in the United States (Hall, Jaffe, and Trajtenberg, 2005) and in Europe (Hall, Thoma, and Torrisi, 2007).

We collect information from the complete set of patent grant publications issued weekly by the U.S. Patent and Trademark Office (USPTO). In this way, we obtain the universe of utility patents awarded by the USPTO to both U.S. and non-U.S. firms.[12] For each patent, we identify patent assignees listed in the patent grant document, countries of these assignees, and whether each assignee is a firm, an individual, or a government entity. Using this information, we match patents to the publicly listed firms in Worldscope. The matching algorithm involves two main steps. First, we standardize patent assignee and firm names, focusing on unifying suffixes and removing the non-informative parts of patent assignee and firm names. Second, we apply multiple fuzzy-string matching techniques to identify the firm, if any, to which each patent belongs. Using this procedure, we match 1,411,376 patents to 13,045 unique firms for patent applications from 1990 to 2010.[13]

We focus on USPTO patents to measure innovation output in the international setting for several reasons. First, we follow the commonly used approach to calculate patent indicators based on information from the most important patent office (the USPTO). We choose this approach because patent regulations (with regard to the scope of patent protection) and patent office practices (governing the processing and publishing of patent applications) across different countries may not be comparable. This makes the aggregation of patent statistics difficult across different patent offices and over time.

Second, for non-U.S. firms, the patents in the sample arguably reflect more important innovations to make these firms willing to accept the costs of securing a patent in the United States.

[12] The USPTO publications are also the source for the National Bureau of Economic Research (NBER) patent database developed by Hall, Jaffe, and Trajtenberg (2001), which is commonly used by researchers.

[13] The Internet Appendix provides a detailed description of the matching procedure and a comparison to the NBER patent matching for the sample of U.S. firms (see Table IA.1).

In this way, we address the criticism that there is excessive heterogeneity in the quality of patents. In our regressions, we include country fixed effects that remove a possible home advantage bias by U.S. firms, as well as any foreign country-level bias caused by applying for U.S. patents.

Last, our sample contains predominantly large firms that commonly protect their innovations by applying for patents simultaneously at the USPTO, European Patent Office (EPO), and Japanese Patent Office (JPO), irrespective of domicile. The use of USPTO patents therefore does not necessarily underestimate innovation output. In robustness checks, we also examine "triadic" patents (i.e., patents applied for simultaneously at all three major patent offices − USPTO, EPO, and JPO). This alternative definition of patent counts alleviates concerns from relying on the USPTO data, and it addresses the concern that USPTO-filed patents may be especially visible or attractive to U.S.-based institutional investors and may thus drive our results on innovation output.

We count patents as of the filing date, which is the time that is closest to when the innovation was created. In the ordinary least squares (OLS) regression tests, we use the logarithm of one plus the number of patents applied for by a firm in a given year (*PATENTS*). We assume that the patent count is zero for firm-years with missing USPTO information. In robustness checks, we use count-data models and patent counts weighted by the number of citations (*CITATIONS*).

Panel A of Table 1 shows that our sample firms were granted a total of 686,541 patents over 2001–2010. The distribution of patents across countries illustrates the global nature of innovation. More than half of the USPTO patents are granted to non-U.S. firms. Japanese firms have the highest average patent count per year, followed by the United States. The United States has the highest number of firms reporting patents, followed by Japan and South Korea. Although German firms are also highly active in innovation, European firms overall filed fewer USPTO patents as a region than Asian or North American firms. Panel B of Table 1 shows that the business equipment sector accounts for more than half of all patents.[14]

[14] Some authors argue that computer, electronics, and software patents may be applied for merely to build patent portfolios for strategic reasons rather than to protect real inventions. In robustness tests, we address this concern by using patent counts adjusted by the average number of patents in each technological class and time period (Bena and Li, 2014).

2.4. Institutional ownership

We collect institutional holdings data from the FactSet/LionShares database for the period 2000–2009.[15] The institutions in the database are professional money managers such as mutual funds, pension funds, bank trusts, and insurance companies. See Ferreira and Matos (2008) for more details on these data.

We define total institutional ownership (*IO_TOTAL*) as the sum of the holdings of all institutions in a firm's stock divided by its total market capitalization at the end of each calendar year.[16] Following Gompers and Metrick (2001) and Ferreira and Matos (2008), we set institutional ownership variables to zero if a stock is not held by any institution in FactSet/LionShares.[17] Next, we separate total institutional ownership by the nationality of the institution. Domestic institutional ownership (*IO_DOM*) is the sum of the holdings of all institutions domiciled in the same country in which the stock is listed divided by the firm's market capitalization, while foreign institutional ownership (*IO_FOR*) is the sum of the holdings of all institutions domiciled in a country different from the one in which the stock is listed divided by the firm's market capitalization.

Panel A of Table 1 shows that the countries with the highest average total institutional ownership as of 2009 are the United States (75%), Canada (53%), Israel (48%), and Sweden (40%). The average institutional ownership is 43% worldwide and 23% for non-U.S. firms in our sample in 2009. Even though they are, on average, minority shareholders, institutions tend to be the most influential group in terms of their share of trading (effectively being the marginal investors) and in terms of shareholder activism. In most countries, the holdings of foreign institutions exceed those of domestic institutions; the exceptions are Canada, Sweden, and the United States.

[15] Since we lag the explanatory variables by one year, our institutional ownership data span the period 2000–2009.
[16] In calculating institutional ownership, we include ordinary shares, preferred shares, American Depositary Receipts (ADRs), Global Depositary Receipts (GDRs), and dual listings.
[17] When we repeat the analysis using only firms with positive holdings, our main results are not affected.

2.5. Financing

We obtain data on firms' financial policies from the Securities Data Corporation's (SDC) New Issues and Worldscope databases. To measure changes in firms' use of external finance, we obtain the proceeds of new equity issues (*EQ_ISSUES*) and new debt issues (*DEBT_ISSUES*) from SDC. As an alternative, we use net equity issuance (*NET_EQ_ISSUES*) and net debt issuance (*NET_DEBT_ISSUES*) from the cash flow statements in Worldscope. We also calculate measures of a firm's total external financing by adding up new equity and debt issuance (*EXT_FIN*) and net equity and debt issuance (*NET_EXT_FIN*). We use the change in cash holdings ($\Delta CASH$) as a measure of firms' internal financing. All these variables are scaled by assets and set to zero for firm-years with missing information.

2.6. Firm characteristics

We obtain several firm-level control variables from the Worldscope database. In the regressions, we control for insider ownership, which we measure by the fraction of closely held shares (*CLOSE*) of both (domestic and foreign) blockholders. The objectives and risk-taking incentives of blockholders are likely to differ from those of institutional investors. Because exporting firms may be more likely to innovate, we also control for the foreign-to-total sales ratio (*FXSALES*). In the innovation output regressions, we use the same control variables as Aghion, Van Reenen, and Zingales (2013), namely, the logarithm of sales (*SALES*), the logarithm of capital-to-labor ratio (*CAPITAL/LABOR*), and cumulative R&D expenditures (*R&D_STOCK*). In the long-term investment regressions, we also include Tobin's *Q* (*TOBIN_Q*), free cash-flow-to-assets ratio (*FCF*), debt-to-assets ratio (*LEVERAGE*), cash holdings-to-assets ratio (*CASH*), and net property, plant, and equipment-to-assets ratio (*TANGIBILITY*). Table 2 shows summary statistics for each variable, and Table A.1 in the Appendix provides variable definitions.

3. Results

3.1. Identification strategy

There is a plausible concern that OLS regressions may suffer from endogenous selection bias. Skilled foreign institutional investors may invest in firms (on the basis of characteristics that are unobservable to us) with better growth prospects or anticipate a surge in innovation, which could explain the positive relation between foreign institutional ownership and long-term investment, employment, or innovation output. To address this concern, we use regressions with firm fixed effects that account for unobserved time-invariant firm heterogeneity.

Further, we implement an instrumental variables (IV) approach using two-stage least squares (2SLS) regressions. Following Aggarwal, Erel, Ferreira, and Matos (2011), we use the inclusion of a firm's stock in the MSCI All Country World Index (MSCI ACWI) as an instrument for foreign institutional ownership, which addresses reverse causality and measurement error concerns, in addition to a possible bias due to time-varying omitted variables. The MSCI ACWI includes large and mid-cap equities across 23 developed markets and 23 emerging markets, so it encompasses all of the MSCI indexes that are the most commonly used benchmarks by foreign portfolio investors (e.g., MSCI World, MSCI EAFE, and MSCI Emerging Markets).[18] We exploit the exogenous variation in foreign institutional ownership around the threshold that determines additions of stocks to the index. Stocks are included in the index such that it covers about 85% of the free float-adjusted market capitalization in each country (Morgan Stanley Capital International, 2015). Specifically, the rule is that stocks are included in the index in descending order of their free float-adjusted market capitalization until the cumulative share of firms included in the index reaches

[18] As of 2015, the MSCI ACWI had 2,480 constituents and the index covered approximately 85% of the global investable equity opportunity set. Cremers, Ferreira, Matos, and Starks (2016) show that the MSCI indexes are the most followed by mutual funds around the world. For example, the Financial Times (Noble and Bullock, 2015) reports that these benchmarks are currently tracked by funds worth $1.7 trillion and that the potential addition of China A-shares to the MSCI indexes might cause significant rebalancing of institutional investors' portfolios. In the U.S. context, research uses the stock membership in the S&P 500 index (e.g., Aghion, Van Reenen, and Zingales, 2013) or the discontinuity in the Russell 1,000/2,000 indexes (e.g., Appel, Gormley, and Keim, 2016) as an exogenous shock to institutional ownership.

85% of the free float-adjusted market capitalization in each country. Because index membership is determined by the mechanical rule that firms are included depending on their market capitalization ranking, the variation in foreign institutional ownership induced by this rule is plausibly exogenous (at least within a bandwidth).

The importance of index membership for foreign institutional ownership is illustrated in Fig. 1 as of 2009 (the final year of our sample period). We sort stocks using their end-of-year free float-adjusted market capitalization in each country and plot the foreign institutional ownership (*IO_FOR*) against the cumulative share of firms. Fig. 1 shows a discontinuity in *IO_FOR* around the 85% threshold of the cumulative share of firms.

Our IV estimation relies on the assumption that the stock addition to the MSCI ACWI is associated with an increase in *IO_FOR* (relevance condition) but does not directly affect our outcome variables except through its impact on ownership by foreign institutions (exclusion restriction). We verify the relevance condition in the first stage estimation, and the exclusion restriction seems reasonable as it is unclear why the stock addition to the index would be directly related to our outcome variables after controlling for the factors that determine index membership. In fact, the exclusion restriction assumption is likely to be satisfied as stocks are added to the MSCI ACWI because they represent a country's investable equities, not because of the firms' expected performance or policies.

3.2. Baseline results

Tables 3–5 present the baseline results of the long-term effects of foreign institutional ownership (*IO_FOR*) obtained using both OLS and IV regressions. Our main outcome variables are: (1) long-term investment (proxied by the ratio of CAPEX plus R&D expenditure-to-assets); (2) human capital (proxied by employment); and (3) innovation output (proxied by patent counts). The regressions include firm and year fixed effects and control for domestic institutional ownership (*IO_DOM*), as well as other firm characteristics that may also affect the outcome

variables. In the IV regressions, the instrument is a dummy variable (*MSCI*) that equals one if a firm is a member of the MSCI ACWI in a given year, and zero otherwise.[19]

Panel A of Table 3 presents the results of the effect of foreign institutional ownership on long-term investment (*CAPEX+R&D*). Column 1 presents the results of the first-stage regression of the IV estimator in which the coefficient on *MSCI* tests whether the instrument is correlated with foreign institutional ownership. In our specification with firm and year fixed effects, the result is driven by within-firm changes in the *MSCI* variable, that is, by stock additions to or deletions from the MSCI ACWI. The coefficient on *MSCI* is positive and statistically significant with a partial *F*-statistic well above the conventional threshold of 10 for weak instruments. Foreign institutions hold about 3 percentage points more of stock market capitalization in firms that are included in the MSCI ACWI.[20]

Column 2 presents the OLS second-stage regression results. The coefficient on foreign institutional ownership (*IO_FOR*) is positive and statistically significant, which means that there is a positive relation between foreign institutional ownership and long-term investment. Column 3 presents IV estimates using *MSCI* as an instrument for foreign institutional ownership. The IV coefficient on foreign institutional ownership is positive and statistically significant. A 3 percentage point increase in foreign institutional ownership leads to an increase of about 0.3 percentage points in long-term investment. The coefficient on foreign institutional ownership from the IV regression is larger than that reported in Column 2 from the OLS regression. The OLS bias toward zero could be caused by either foreign institutions selecting firms that are currently

[19] To check the validity of our identification strategy, we also estimate reduced-form regressions using the instrumental variable (*MSCI*) as the explanatory variable. Table IA.2 in the Internet Appendix reports the results for long-term investment, employment, and innovation output. The coefficients on *MSCI* are positive and statistically significant in all specifications, which indicates that the data support our identification strategy.

[20] As a placebo test, we also estimate the first-stage regression of domestic institutional ownership (*IO_DOM*) on the *MSCI* instrument. Table IA.3 in the Internet Appendix shows the results. The coefficient on *MSCI* is statistically insignificant. Since domestic institutions do not increase (decrease) their holdings following stock additions to (deletions from) the MSCI ACWI, this result suggests that the index recomposition events do not reveal new information to institutional investors about the firms' future growth prospects (Denis, McConnell, Ovtchinnikov, and Yu, 2003). This result also does not support other channels that could explain our findings, such as investor recognition and attention or changes in capital supply, and thus lends further support to the validity of the exclusion restriction.

underinvesting (but may increase investment in the future) or the attenuation bias stemming from measurement error in foreign institutional ownership.[21]

Panel B of Table 3 presents the results of the effect of foreign institutional ownership separately for the individual components of long-term investment: *CAPEX* and *R&D*. The OLS coefficient estimates on *IO_FOR* in Columns 1 and 3 are positive and statistically significant, indicating a positive association between foreign institutional ownership and both components of long-term investment. The IV coefficient estimates on *IO_FOR* in Columns 2 and 4 are also positive and statistically significant. A 3 percentage point increase in foreign institutional ownership leads to an increase of about 0.2 percentage points in *CAPEX* and to an increase of about 0.1 percentage points in *R&D*, which represents about 5% of the mean in both cases.[22]

Table 4 reports the results for human capital as proxied by the logarithm of the number of employees (*LABOR*). In Column 1, we re-estimate the first-stage regression using the sample for which *LABOR* is available. The coefficient of 0.028 on *MSCI* is almost unchanged compared to that reported in Column 1 of Table 3. The OLS coefficient estimate on *IO_FOR* in Column 2 is positive and statistically significant, indicating a positive association between foreign institutional ownership and employment. The IV coefficient on foreign institutional ownership is also positive and statistically significant. A 3 percentage point increase in foreign institutional ownership leads to an increase of about 12% in the number of employees.

Panel A of Table 5 presents the results of the effect of foreign institutional ownership on innovation output as proxied by the logarithm of one plus the number of patents (*PATENTS*). In Column 1, we re-estimate the first-stage regression using the sample for which *PATENTS* is available. The coefficient of 0.027 on *MSCI* is almost unchanged compared to that reported in Column 1 of Table 3. The OLS coefficient estimate on *IO_FOR* in Column 2 is positive and

[21] In fact, foreign institutional ownership might be noisy owing to differences in mandatory portfolio holdings disclosure rules across countries, as well as recording and classification mistakes.

[22] Alternatively, we can gauge the economic significance by estimating the impact of a one standard deviation increase in foreign institutional ownership (0.07) on long-term investment: an increase of 0.7 percentage points in *CAPEX+R&*D (corresponds to 10% of the mean), an increase of 0.5 percentage points in *CAPEX* (corresponds to 11% of the mean), and an increase of 0.2 percentage points in *R&D* (corresponds to 9% of the mean).

statistically significant. There is a positive association between foreign institutional ownership and innovation output. The IV coefficient estimate on foreign institutional ownership is also positive and statistically significant. A 3 percentage point increase in foreign institutional ownership leads to an increase of about 11% in patent counts. Similar to Tables 3 and 4 on long-term investment and employment, the estimates of the effect of foreign institutional ownership are larger in the IV regression compared to the OLS regression. This result suggests that the OLS regression underestimates the positive effect of foreign institutional ownership on innovation output by treating institutional ownership as exogenous. Aghion, Van Reenen, and Zingales (2013) also find a negative selection bias indicating that OLS regressions underestimate the positive effect of institutional ownership on innovation for U.S. firms.[23]

We also examine the effect of foreign institutional ownership on innovation output using a Poisson regression – a nonlinear count data model (which have a mass point at zero).[24] The results are reported in Panel B of Table 5. Because the firms without innovation output (zero patents) can now be included, we are able to use the full sample of firms. We include firm fixed effects using the pre-sample mean scaling method introduced by Blundell, Griffith, and Van Reenen (1999).[25] In addition, we account for the endogeneity of foreign institutional ownership by using the control function approach (Blundell and Powell, 2004). The coefficients on foreign institutional ownership are positive and statistically significant. Using the IV estimate in Column 3, a 3 percentage point increase in foreign institutional ownership is associated with about an 18% increase in the probability of obtaining an additional patent per year.[26]

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[23] We repeat our analysis excluding firm-years with zero patents by estimating regressions using the logarithm of the number of patents as the dependent variable. The results reported in Table IA.4 in the Internet Appendix show that the positive relation between foreign institutional ownership and patents is robust when we use this alternative specification.

[24] Alternatively, we estimate negative binomial regressions. The results reported in Table IA.5 in the Internet Appendix show that the positive relation between foreign institutional ownership and patents is robust when we use this alternative count data model.

[25] In untabulated results, we find that our results are qualitatively similar using the Hausman, Hall, and Griliches (1984) fixed effect Poisson model.

[26] For the Poisson regression with control function, we have also estimated bootstrapped cluster adjusted standard errors. The *t*-statistics associated with the coefficient on foreign institutional ownership are significant and range from 4.84 to 13.73 over the 300 bootstrap replications.

The IV results suggest that (foreign) indexed money managers influence corporate policies. Appel, Gormley, and Keim (2016) also suggest that quasi-indexed investors increasingly play an active role in corporate governance in the United States. Following Appel, Gormley, and Keim (2016), we repeat the IV estimation using a sample restricted to firms in the 10% bandwidth of the number of stocks around the MSCI ACWI cutoff that determines inclusion of a stock in the index in which stock membership is likely to be random. The MSCI ACWI cutoff point is the (free float-adjusted) market capitalization ranking of the first stock after which the index coverage is at least 85% of the free float-adjusted market capitalization in each country. Table 6 shows that the IV results are similar to those in Tables 3–5 when we use the 10% bandwidth.

3.3. Quasi-natural experiment: stock additions to the MSCI index

To further establish a causal effect of foreign institutional ownership (and validate the quality of our instrument), we perform a quasi-natural experiment using additions of stocks to the MSCI ACWI. In this approach, we employ a difference-in-differences estimation around the time a stock is added to the MSCI ACWI (treated firms). We identify 574 additions to the index and use the two years before and after each stock addition. We select control firms using propensity score matching with replacement that best matches each firm in the treatment group (the nearest neighbor) on multiple lagged covariates (two years before the event): *CAPEX+R&D*, *PATENTS*, *CLOSE*, *FXSALES*, *SALES*, *R&D_STOCK*, *CAPITAL/LABOR*, *IO_FOR*, and country and industry fixed effects. Panel A of Table 7 reports results of the tests of equality of pre-treatment means and medians between the treatment and control groups. In general, we cannot reject the hypothesis of equal means or medians between the treatment and control groups.

Panel B of Table 7 presents the results of difference-in-differences estimators using the treatment-control sample and firm and year fixed effects specifications. In these tests, the explanatory variable of interest is the interaction of the *TREATED* dummy variable (which equals one if a firm is added to the MSCI ACWI, and zero otherwise) with the *AFTER* dummy variable (which equals one in the year a firm is added to the MSCI ACWI and thereafter, and zero

otherwise). The interaction term coefficient captures the differential effect between the treatment and control groups following a stock addition to the MSCI ACWI.

Column 1 shows that foreign institutional ownership increases significantly by 2 percentage points of market capitalization after a (treated) firm is added to the MSCI ACWI relative to control firms. Column 2 shows that the differential effect on domestic institutional ownership is near zero and statistically insignificant, which supports the exclusion restriction.[27] We also find that firms in the treatment group increase long-term investment, employment, and innovation output (Columns 3–5) relative to control firms in the post-treatment period. These results are statistically and economically significant. The firms in the treatment group experience a 0.5 percentage point increase in long-term investment, a 14.3% increase in employment, and a 5.4% increase in innovation output following the addition of their stocks to the MSCI ACWI. These results are qualitatively similar to those obtained using the IV approach in Tables 3–5.[28]

Fig. 2 shows the evolution of the differences in foreign and domestic institutional ownership between the treatment and control groups in the two years before and after a firm's stock is added to the MSCI ACWI (based on estimates in which *TREATED* is interacted with indicators for each event year). The index additions occur between event year −1 and year 0. Panel A shows that the two groups follow parallel trends in the pre-treatment period and that *IO_FOR* increases significantly after a firm is added to the MSCI ACWI. Panel B shows that there is no such pattern for *IO_DOM*, which alleviates concerns that the addition of a stock to the MSCI ACWI is driven by good news about the firm, since such news would likely drive all institutional investors to increase their stock holdings. Fig. 3 shows a positive differential effect on long-term investment, employment, and innovation output after a firm's stock is added to the MSCI ACWI.

We also perform a quasi-natural experiment using deletions of stocks from the MSCI ACWI.

[27] This result suggests that foreign institutions are not buying their shares from domestic institutions. In unreported tests, we find that there is a statistically significant decrease in closely-held shares, which suggests that insiders are the primary sellers of shares after MSCI ACWI additions.

[28] We also estimate difference-in-differences regressions including country-by-year and industry-by-year fixed effects. The estimates reported in Table IA.6 in the Internet Appendix are qualitatively similar to those in Table 7.

Table IA.7 in the Internet Appendix shows a negative differential effect on long-term investment, employment, and innovation output after a firm has been deleted from the MSCI ACWI. The coefficient on long-term investment is not statistically significant, which may be due to the small number of deletions (167 events). The results for stock deletions are opposite to those for stock additions, providing further support for the validity of our identification strategy.

3.4. External financing

A concern with our results might be that the addition of a firm's stock to the index could increase the supply (or decrease the cost) of external capital, which could enable firms to raise more external finance and thus increase long-term investment. To address this concern, we use the difference-in-differences estimation to study the impact of stock additions to the MSCI ACWI on firms' financial policies.

Columns 1 and 2 of Table 8 show that new equity issuance (*EQ_ISSUES*) and net equity issuance (*NET_EQ_ISSUES*) decrease by 1 percentage point and 0.7 percentage points, respectively, after a (treated) firm is added to the MSCI ACWI relative to control firms. Columns 3 and 4 show that treated firms increase new debt issuance (*DEBT_ISSUES*) and net debt issuance (*NET_DEBT_ISSUES*) by 0.3 percentage points and 1 percentage point more than control firms following stock additions. Column 5 shows that treated firms decrease new external debt and equity financing (*EXT_FIN*) by 0.7 percentage points more than control firms, while Column 6 shows that the differential effect on net external debt and equity financing (*NET_EXT_FIN*) is statistically insignificant. For internal financing, Column 7 shows that cash holdings ($\Delta CASH$) of treated firms decrease by 0.9 percentage points versus control firms following stock additions.

Fig. 4 shows the evolution of the differences in new equity issuance, new debt issuance, external financing, and cash holdings between the treatment and control groups in the two years before and after a firm's stock is added to the MSCI ACWI. Panel A shows that *EQ_ISSUES* decreases after a firm's stock is added to the MSCI ACWI, while Panel B shows that *DEBT_ISSUES* increases after a firm's stock is added to the MSCI ACWI. Panels C and D show

that both *EXT_FIN* and Δ*CASH* decrease following the inclusion of a firm's stock in the MSCI ACWI.[29]

The results in Table 8 and Fig. 4 suggest that firms experience an increase in financing needs due to an increase in long-term investments following the addition of their shares to the MSCI ACWI. This financing need is covered by a decrease in cash holdings (i.e., internal funds) and new debt issues, which is consistent with the pecking order theory of capital structure. These results also show that treated firms do not issue more equity following additions of their shares to the MSCI ACWI, which indicates that an increase in the supply of capital (or a decrease in the cost of capital) does not explain our findings. The increase in debt issuance together with a decrease in cash holdings is consistent with the reduction of excess cash that managers can spend at their discretion (Jensen, 1986).[30]

Overall, the results do not support the alternative hypothesis that the increases in long-term investment, employment, and innovation output are driven by increases in the supply of external capital following the addition of a stock to the MSCI indexes. Rather, the results are consistent with foreign institutional investors being involved in monitoring firm management.

3.5. Monitoring channel

Our findings of a positive effect of foreign institutional ownership on long-term investment, employment, and innovation output are consistent with the idea that foreign institutions reduce managerial entrenchment by monitoring managers otherwise enjoying a "quiet" life (Bertrand and Mullainathan, 2003) or insider blockholders that extract private benefits of control. Monitoring refers to influencing management directly (by voice) or indirectly by selling their shares (exit or voting with their feet).

To examine whether the monitoring channel is operative in our sample, we first examine

[29] We also present the evolution of the differences in net equity issuance (*NET_EQ_ISSUES*) and net debt issuance (*NET_DEBT_ISSUES*) in Fig. IA.3 in the Internet Appendix.

[30] Hall and Lerner (2010) also find that large established firms prefer internal funds for the financing of R&D and innovation.

whether our effect is driven by foreign investors with longer versus shorter investment horizons. Short-term investors have fewer incentives to monitor and are more likely to motivate corporate managers to focus on short-term (earnings) goals rather than long-term investment. For example, the Kay Review (2012) in the United Kingdom argues that R&D expenditures by British businesses have been in steady decline and that the short-term incentives of asset managers have been pushed down to corporate managers. Following Gaspar, Massa, and Matos (2005) and Harford, Kecskes, and Mansi (2015), we measure investment horizons using investors' portfolio turnover (churn rate). *IO_FOR_LT* is ownership by long-term foreign institutional investors, defined as those with portfolio turnover below the median. *IO_FOR_ST* is ownership by short-term foreign institutional investors, defined as those with portfolio turnover above the median.

Panel A of Table 9 reports the results. We estimate OLS regressions with *CAPEX+R&D* (Column 1), *LABOR* (Column 2), and *PATENTS* (Column 3) as dependent variables and find a positive relation with both long-term foreign institutional ownership (*IO_FOR_LT*) and short-term foreign institutional ownership (*IO_FOR_ST*). Consistent with the monitoring hypothesis, however, the relation is more pronounced for *IO_FOR_LT*.

Second, we analyze whether our effect is driven by the nationality of foreign institutional investors depending on the legal regime of the country of domicile. Previous research finds a positive relation between firm-level governance and ownership by institutional investors domiciled in countries with strong investor protection. Following Aggarwal, Erel, Ferreira, and Matos (2011), we partition foreign institutional ownership according to the legal origin of the institution's home country as defined in La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998): common foreign institutional ownership (*IO_FOR_COMMON*) or civil foreign institutional ownership (*IO_FOR_CIVIL*).

Panel B of Table 9 reports the results. We find a positive and significant relation between all outcome variables and *IO_FOR_COMMON*. The *IO_FOR_CIVIL* coefficient, however, is statistically significant only in the case of *LABOR*. These results are consistent with foreign institutions from common law countries "exporting" good governance practices, providing further

support for the monitoring hypothesis.

Third, we examine whether the increases in long-term investment, employment, and innovation output due to the presence of foreign institutional ownership are larger when managers are entrenched. We measure managerial entrenchment using a firm-level index consisting of 41 governance attributes (*GOV*) defined by Aggarwal, Erel, Stulz, and Williamson (2009) and Aggarwal, Erel, Ferreira, and Matos (2011). The *GOV* index provides a firm-level governance measure that is comparable across countries and incorporates information on board structure, anti-takeover provisions, auditors, compensation, and ownership structure. The index is constructed using data obtained from RiskMetrics/Institutional Shareholder Services.[31]

Table 10 reports the results. We estimate OLS regressions with *CAPEX+R&D* (Column 1), *LABOR* (Column 4), and *PATENTS* (Column 7) as dependent variables and foreign institutional ownership (*IO_FOR*), the governance index (*GOV*), and the interaction *IO_FOR* × *GOV* as main explanatory variables.[32] We find a positive and significant relation between foreign institutional ownership and long-term investment, employment, and innovation output when we control for corporate governance. Further, we find that the effect is stronger when corporate governance is weaker, as indicated by the negative and significant coefficient on the interaction variable *GOV* × *IO_FOR*. These results suggest that the effect of foreign institutional ownership is more pronounced when managers are more entrenched and are thus consistent with the monitoring channel.

Fourth, we examine the interaction of *IO_FOR* with the anti-self-dealing index (*ANTI_SD*) of Djankov, La Porta, Lopez-de-Silanes, and Shleifer (2008), which measures the legal protection of minority shareholders against expropriation by corporate insiders at the country level. Columns 2, 5, and 8 of Table 10 show a negative and significant coefficient on the interaction variable

[31] *GOV* is similar in spirit to the governance index of Gompers, Ishii, and Metrick (2003), but the scale is reversed—a higher *GOV* means more shareholder-friendly governance practices.
[32] The sample of firms in these tests is smaller because of sparser coverage of the *GOV* measure, which is limited to the largest market capitalization firms in each country.

ANTI_SD × *IO_FOR*, which suggests that the effect of foreign institutional investors is more pronounced in countries in which the problem of investor expropriation is more acute. These findings are again consistent with the monitoring hypothesis.[33]

Our final test is based on the idea that, according to the monitoring channel, product market competition and institutional ownership are substitutes governance mechanisms. Specifically, in highly competitive environments there is little managerial slack and therefore little need for institutional monitoring. An alternative view is that institutional involvement alleviates managers' career concerns and risks and increases tolerance for failure (Manso, 2011). This career concern channel predicts that the positive effect of foreign institutions on innovation should be stronger when competition is higher. Following Aghion, Van Reenen, and Zingales (2013), we measure *COMPETITION* as one minus the Lerner index for a given two-digit SIC industry.[34] In Columns 3, 6, and 9 of Table 10, we find that the *IO_FOR* coefficient remains positive and significant when we control for *COMPETITION*. In Column 9, we find that the *COMPETITION* × *IO_FOR* coefficient is negative and significant, which indicates a more pronounced effect of foreign institutional ownership on innovation output in less competitive industries (the interaction variable coefficient is insignificant in the case of long-term investment and employment in Columns 3 and 6). We conclude that the results in Tables 9 and 10 support the view that the positive effect of foreign institutional ownership on long-term investment, employment, and innovation output is due to improved corporate governance through better monitoring.

3.6. Human capital

We show that foreign institutional ownership has a positive impact on employment, but this may be at a cost of lower salaries or an increase in the relative importance of low- versus high-

[33] We also analyze whether the impact of foreign institutional ownership varies with the legal origin and the level of economic development (proxied by GDP per capita) of the target country of foreign portfolio investments. Table IA.8 in the Internet Appendix shows that the effect of foreign institutional ownership is more pronounced in civil law countries, while the effect is not statistically different in more developed versus less developed countries.
[34] We obtain similar results when we use the Lerner index at the country-industry-year level.

skill jobs. We thus explore how foreign institutional ownership affects measures of human capital: salaries as a fraction of sales (*STAFF_COST*) and average staff costs per employee (*AV_STAFF_COST*). These variables are available only for non-U.S. firms because there is no disclosure of total wage bills by U.S. firms. We also examine the effect of foreign institutional ownership on organization capital. Following Eisfeldt and Papanikolau (2013), we proxy for investment in organization capital using the ratio of selling, general, and administrative expenses-to-sales (*SG&A*).

Table 11 shows the results for all proxies of investment in human capital using OLS (Columns 1, 3, and 5) and IV regressions (Columns 2, 4, and 6). We find a positive and significant effect of foreign institutional ownership on human and organization capital. The effects are also economically significant. Using the IV estimates in Columns 2 and 4, a 3 percentage point increase in foreign institutional ownership leads to a 3.9 percentage point increase in the ratio of staff costs-to-sales and a 3.6% increase in the average staff costs. The magnitude of the effect is particularly strong in the case of organization capital: a 3 percentage point increase in foreign institutional ownership leads to an increase of about 5.7 percentage points in the ratio of SG&A-to-sales, as shown in Column 6.

3.7. Productivity and performance

So far, our evidence supports the view that foreign institutional investors foster long-term investments in tangible, intangible, and human capital, leading to higher innovation output. However, not all investment and innovative activities necessarily enhance firm value. To examine this issue, we conduct additional tests using several measures of firm performance. Table 12 presents the results using both OLS and IV regressions.

We first ask whether foreign institutional ownership increases total factor productivity. We estimate a regression of the logarithm of total sales (*SALES*) on foreign institutional ownership (*IO_FOR*) controlling for the logarithm of capital (*CAPITAL*) and the logarithm of labor (*LABOR*). Columns 1 and 2 of Table 12 show that the *IO_FOR* coefficient is positive and statistically

significant, which indicates that foreign institutional ownership leads to productivity gains. Using the IV estimate in Column 2, a 3 percentage point increase in foreign institutional ownership leads to a 5.8% increase in total sales.[35]

The second measure is foreign operations. In Columns 3 and 4 of Table 12, we examine whether foreign institutional ownership leads to a growth in products and services that are marketed internationally. We use foreign sales as a fraction of total sales (*FXSALES*) as the dependent variable. We find that foreign institutional ownership leads to an increase in the internationalization of firms' operations, as indicated by the positive and significant coefficient on *IO_FOR*. Using the IV estimate in Column 4, a 3 percentage point increase in foreign institutional ownership leads to a 1.3 percentage point increase in the fraction of foreign sales.

Our final measure is firm valuation. We estimate a regression in which Tobin's *Q* (*TOBIN_Q*) is the dependent variable. Columns 5 and 6 of Table 12 show that foreign institutional ownership leads to an increase in firm valuation. Using the IV estimate in Column 6, a 3 percentage point increase in foreign institutional ownership leads to an increase of about 0.12 in Tobin's *Q*. Overall, the results of Table 12 suggest that increases in long-term investment in tangible, intangible, and human capital enhance firm value.

3.8. Sample of non-U.S. firms and robustness checks

We examine our results excluding U.S. firms because the United States represents a large fraction of our sample, institutional ownership is much higher in the United States than elsewhere in the world, and the quality of the data on institutional holdings, R&D, and patents is better in the United States than elsewhere. Table 13 reports the results when we restrict the sample to non-U.S. firms. Panels A and B show that the OLS and IV estimates are qualitatively similar to those presented in Tables 3–6. The only exception is that the coefficient on *IO_FOR* is positive but statistically insignificant in the IV specification for *CAPEX+R&D* (Column 2 of Panel A). Panel

[35] In untabulated results, we obtain qualitatively similar results if our dependent variable is the logarithm of sales per employee.

C shows that the difference-in-differences estimates are similar to those in Table 7. We conclude that our findings based on the full sample are unchanged when we focus on the sample of non-U.S. firms.

We also perform robustness checks of our long-term investment results. These results are presented in the Internet Appendix. In Table IA.9, we find similar results for foreign institutional ownership in the following cases: (1) the sample is restricted to the 2005–2010 post-IFRS adoption period, when R&D disclosure is harmonized worldwide; (2) the sample is restricted to firms with assets in excess of $10 million; (3) we control for country-by-year and industry-by-year fixed effects to capture any country-specific and industry-specific time trends; (4) we scale CAPEX plus R&D expenditures by sales (instead of assets, as in our main tests); and (5) the sample is restricted to firms with positive R&D.

Table IA.10 presents several robustness checks of our innovation output results. First, the sample is restricted to 2001–2008 to address truncation bias concerns because patents can be granted multiple years after their applications are filed. Second, the sample is restricted to firms with assets in excess of $10 million. Third, we include country-by-year and industry-by-year fixed effects. Fourth, we consider alternative proxies for innovation output. Because patents may take several years to develop, we use patent counts computed over a three-year rolling window in Column 4. We also use patent counts scaled by technological class and time period in Column 5 and the ratio of *PATENTS*-to-*R&D_Stock* (i.e., patent counts per a measure of input into the innovation process) in Column 6.[36] Because the quality and value of patents may differ, we also consider patent counts weighted by the number of citations in Column 7 and "triadic" patents (i.e., patents filed with all three major patent offices − USPTO, EPO, and JPO) in Column 8. The findings in all these robustness tests confirm our baseline result that firms with higher foreign institutional ownership produce more innovation output.

[36] Patent counts in different technology classes may not be directly comparable. In addition, large increases in the number of awarded patents in some technology classes over time might reflect the evolution of the USPTO practices with respect to what is a patentable invention, so patent counts from different time periods may not be time-consistent measures of innovation productivity even within the same technology class.

4. Conclusion

We study the long-term effects of foreign institutional ownership on firm policies using firm-level data from 30 countries over the 2001–2010 period. We identify the effects by exploiting the exogenous increase in foreign institutional ownership that follows the addition of a stock to the MSCI indexes. We find that higher foreign institutional ownership leads to more long-term investment in tangible, intangible, and human capital. Foreign institutional ownership also leads to a significant increase in innovation output, as well as to increases in internationalization of a firm's operations and firm valuation. We show that these effects are explained by the disciplinary and monitoring roles of foreign institutions.

Our results help to dismiss popular fears that portray foreign investors as predominantly interested in short-term gains, often at the expense of long-term investment, employment, and innovation. Although our sample does not encompass all types of foreign owners, we examine the increasing role of foreign portfolio investors who hold minority stakes in firms around the world. We conclude that the globalization of firms' shareholder structures due to increasing cross-border portfolio flows is a positive force for capital formation that facilitates the development of new technologies, products, and services and creates jobs. Our results do not support economic nationalism aimed at protecting local firms from foreign capital. Rather, our findings suggest that openness to international portfolio investment may generate positive externalities for the real economy.

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Table 1

Institutional ownership, long-term investment, and innovation

This table shows the number of publicly listed firms and statistics on capital expenditures (CAPEX), research and development (R&D) expenditures, number of patents applied for with the USPTO, and foreign and domestic institutional ownership (as a fraction of market capitalization) by country (Panel A) and industry (Panel B). Variable definitions are provided in Table A.1 in the Appendix. The sample consists of Worldscope non-financial and non-utility firms in the 2001–2010 period.

Panel A: Statistics by country

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

Table 1 (continued)

Panel B: Statistics by industry

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

Table 2
Summary statistics

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

	Mean	Median	Standard deviation	Minimum	Maximum	Number of observations
CAPEX+R&D	0.071	0.043	0.085	0.000	0.798	181,173
CAPEX	0.047	0.027	0.062	0.000	0.458	181,173
R&D	0.024	0.000	0.062	0.000	0.340	181,173
LABOR	4,133	650	10,888	1	70,700	166,305
PATENTS	1.280	0.000	5.809	0.000	43.000	181,173
SALES ($ million)	941	120	2,740	0	18,341	181,173
FXSALES	0.157	0.000	0.272	0.000	0.954	181,173
TOBIN_Q	2.120	1.243	4.451	0.413	60.589	171,432
STAFF_COST	0.342	0.185	0.858	0.001	9.238	73,259
AV_STAFF_COST ($ thousands)	45	36	43	0	328	70,274
SG&A	0.440	0.201	0.850	0.026	4.956	144,800
IO_TOTAL	0.153	0.021	0.259	0.000	1.000	181,173
IO_FOR	0.027	0.001	0.067	0.000	1.000	181,173
IO_DOM	0.126	0.004	0.246	0.000	1.000	181,173
IO_FOR_LT	0.023	0.000	0.060	0.000	1.000	181,173
IO_FOR_ST	0.004	0.000	0.019	0.000	1.000	181,173
IO_FOR_COMMON	0.019	0.000	0.056	0.000	1.000	181,173
IO_FOR_CIVIL	0.007	0.000	0.021	0.000	1.000	181,173
CLOSE	0.287	0.242	0.275	0.000	0.913	181,173
CAPITAL/LABOR	192	41	790	0	9,959	181,173
R&D_STOCK ($ million)	30	0	92	0	490	181,173
FCF	-0.132	0.015	0.729	-7.818	0.344	179,360
LEVERAGE	0.257	0.194	0.346	0.000	3.219	181,046
CASH	0.180	0.116	0.189	0.000	0.989	180,998
TANGIBILITY	0.284	0.240	0.222	0.000	0.948	181,166
GOV	0.537	0.537	0.128	0.220	0.927	37,061
ANTI_SD	0.617	0.654	0.187	0.181	1.000	181,173
COMPETITION	0.760	0.765	0.072	0.404	1.000	181,173
EQ_ISSUES	0.012	0.000	0.091	0.000	2.003	181,173
NET_EQ_ISSUES	0.026	0.000	0.124	-0.090	1.090	181,173
DEBT_ISSUES	0.002	0.000	0.013	0.000	0.178	181,173
NET_DEBT_ISSUES	0.006	0.000	0.087	-0.263	0.549	181,173
EXT_FIN	0.014	0.000	0.095	0.000	2.058	181,173
NET_EXT_FIN	0.035	0.000	0.179	-0.236	1.462	181,173
Δ*CASH*	0.001	0.000	0.105	-0.546	0.519	181,173
MSCI	0.077	0.000	0.266	0.000	1.000	181,173

Table 3
Foreign institutional ownership and long-term investment

This table shows results of ordinary least squares (OLS) and instrumental variables (IV) firm-level panel regressions of long-term investment on institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001–2010 period. In Panel A the dependent variable is the sum of capital expenditures and R&D expenditures as a fraction of assets (*CAPEX+R&D*). In Panel B the dependent variable is *CAPEX* or *R&D*. Regressions in Panel B include the same control variables as those in Panel A (coefficients not shown). In the IV regression, foreign institutional ownership is instrumented with *MSCI* (a dummy variable that equals one if a firm is a member of the MSCI ACWI in a given year, and zero otherwise). All explanatory variables are lagged by one year. Variable definitions are provided in Table A.1 in the Appendix. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Long-term investment

Dependent variable	First stage *IO_FOR* (1)	OLS *CAPEX+R&D* (2)	IV *CAPEX+R&D* (3)
IO_FOR		0.022***	0.094**
		(0.005)	(0.038)
IO_DOM	0.003*	0.001	0.001
	(0.002)	(0.005)	(0.003)
CLOSE	-0.010***	0.005***	0.005***
	(0.001)	(0.001)	(0.001)
FXSALES	0.004***	-0.001	-0.001
	(0.002)	(0.002)	(0.002)
log(*SALES*)	0.004***	-0.001	-0.001**
	(0.000)	(0.001)	(0.001)
log(*CAPITAL/LABOR*)	0.002***	0.001**	0.001**
	(0.000)	(0.001)	(0.001)
TOBIN_Q	0.000***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)
FCF	-0.001***	-0.002***	-0.002**
	(0.000)	(0.001)	(0.001)
LEVERAGE	-0.004***	-0.023***	-0.023***
	(0.001)	(0.003)	(0.002)
CASH	0.008***	0.038***	0.037***
	(0.001)	(0.003)	(0.003)
TANGIBILITY	-0.010***	-0.036***	-0.036***
	(0.002)	(0.005)	(0.004)
MSCI	0.029***		
	(0.002)		
Year fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
R^2	0.81	0.64	
Number of observations	175,912	175,912	175,912

Table 3 (continued)

Panel B: Long-term investment - individual components

Dependent variable	OLS *CAPEX* (1)	IV *CAPEX* (2)	OLS *R&D* (3)	IV *R&D* (4)
IO_FOR	0.017***	0.073**	0.005*	0.031**
	(0.003)	(0.034)	(0.003)	(0.015)
IO_DOM	0.011***	0.011***	-0.010***	-0.009***
	(0.003)	(0.002)	(0.002)	(0.002)
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
R^2	0.56		0.80	
Number of observations	175,912	175,912	175,912	175,912

Table 4

Foreign institutional ownership and employment

This table shows results of ordinary least squares (OLS) and instrumental variables (IV) firm-level panel regressions of employment on institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001–2010 period. The dependent variable is the logarithm of the number of employees (*LABOR*). In the IV regression, foreign institutional ownership is instrumented with *MSCI* (a dummy variable that equals one if a firm is a member of the MSCI ACWI in a given year, and zero otherwise). All explanatory variables are lagged by one year. Variable definitions are provided in Table A.1 in the Appendix. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	First stage *IO_FOR* (1)	OLS *LABOR* (2)	IV *LABOR* (3)
IO_FOR		0.651***	3.876***
		(0.061)	(0.458)
IO_DOM	-0.000	0.392***	0.393***
	(0.002)	(0.029)	(0.025)
CLOSE	-0.010***	0.001	0.037***
	(0.001)	(0.016)	(0.014)
FXSALES	0.005***	0.100***	0.083***
	(0.002)	(0.016)	(0.021)
log(*SALES*)	0.005***	0.329***	0.313***
	(0.000)	(0.012)	(0.007)
TOBIN_Q	0.000***	0.004***	0.004***
	(0.000)	(0.001)	(0.001)
FCF	-0.001***	0.045***	0.048***
	(0.000)	(0.008)	(0.007)
LEVERAGE	-0.004***	-0.088***	-0.075***
	(0.001)	(0.014)	(0.015)
CASH	0.008***	-0.075***	-0.103***
	(0.002)	(0.027)	(0.025)
TANGIBILITY	-0.002	0.230***	0.238***
	(0.002)	(0.031)	(0.037)
MSCI	0.028***		
	(0.002)		
Year fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
R^2	0.81	0.97	
Number of observations	161,443	161,443	161,443

Table 5
Foreign institutional ownership and innovation output

This table shows results of firm-level panel regressions of innovation output on institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001–2010 period. Panel A shows results of ordinary least squares (OLS) and instrumental variables (IV) regressions in which the dependent variable is the logarithm of one plus the number of patents applied for with the USPTO (*PATENTS*). In the IV regression, foreign institutional ownership is instrumented with *MSCI* (a dummy variable that equals one if a firm is a member of the MSCI ACWI in a given year, and zero otherwise). Panel B shows results of Poisson regressions in which the dependent variable is the number of patents applied for with the USPTO. In Panel B, regressions include firm fixed effects using the pre-sample mean scaling method of Blundell, Griffith, and Van Reenen (1999), and the IV estimation is implemented using the control function approach of Blundell and Powell (2004). All explanatory variables are lagged by one year. The sample in Panel A consists of firms with at least one patent applied for during the sample period. The sample in Panel B consists of all firms. Variable definitions are provided in Table A.1 in the Appendix. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Linear model

Dependent variable	First stage *IO_FOR* (1)	OLS *PATENTS* (2)	IV *PATENTS* (3)
IO_FOR		0.243**	3.655***
		(0.099)	(1.006)
IO_DOM	-0.005*	0.107***	0.127***
	(0.003)	(0.033)	(0.043)
CLOSE	-0.012***	0.054***	0.099***
	(0.003)	(0.020)	(0.028)
FXSALES	0.003	-0.057**	-0.068**
	(0.003)	(0.028)	(0.032)
log(*SALES*)	0.005***	0.051***	0.032***
	(0.001)	(0.006)	(0.009)
log(*CAPITAL*/*LABOR*)	0.002***	-0.001	-0.010
	(0.001)	(0.008)	(0.008)
log(*R&D_STOCK*)	-0.000	0.009***	0.011***
	(0.000)	(0.002)	(0.003)
MSCI	0.027***		
	(0.002)		
Year fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
R^2	0.82	0.82	
Number of observations	48,096	48,096	48,096

Table 5 (continued)

Panel B: Count data model

Dependent variable	First stage *IO_FOR* (1)	Poisson *PATENTS* (2)	Poisson (control function) *PATENTS* (3)
IO_FOR		1.494***	5.446***
		(0.179)	(0.455)
IO_DOM	-0.010***	0.827***	0.933***
	(0.002)	(0.049)	(0.049)
CLOSE	-0.006**	0.485***	0.574***
	(0.003)	(0.044)	(0.050)
FXSALES	0.031***	0.272***	0.158***
	(0.003)	(0.052)	(0.042)
log(*SALES*)	0.005***	0.113***	0.059***
	(0.001)	(0.015)	(0.011)
log(*CAPITAL*/*LABOR*)	0.001***	0.045**	0.034*
	(0.000)	(0.019)	(0.019)
log(*R&D_STOCK*)	0.001***	0.162***	0.153***
	(0.000)	(0.014)	(0.013)
MSCI	0.066***		
	(0.003)		
Year fixed effects	Yes	Yes	Yes
Firm fixed effects (pre-sample)	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
R^2	0.29	0.68	0.68
Number of observations	181,173	181,173	181,173

Table 6
Instrumental variables estimates with bandwidth

This table shows results of instrumental variables (IV) firm-level panel regressions of long-term investment, employment, and innovation output on institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001–2010 period. The sample is restricted to firms in the 10% bandwidth of the number of stocks around the MSCI ACWI cutoff point in each country. The cutoff point is the (free float-adjusted) market capitalization ranking of the first stock after which the index coverage is at least 85% of the free float-adjusted market capitalization in each country. The dependent variables are the sum of capital expenditures and R&D expenditures as a fraction of assets (*CAPEX+R&D*), the logarithm of the number of employees (*LABOR*), and the logarithm of one plus the number of patents applied for with the USPTO (*PATENTS*). Foreign institutional ownership is instrumented with *MSCI* (a dummy variable that equals one if a firm is a member of the MSCI ACWI in a given year, and zero otherwise). Regressions include the same control variables as those in Tables 3–5 (coefficients not shown). Variable definitions are provided in Table A.1 in the Appendix. All explanatory variables are lagged by one year. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	First stage	IV		
Dependent variable	*IO_FOR*	*CAPEX+R&D*	*LABOR*	*PATENTS*
	(1)	(2)	(3)	(4)
IO_FOR		0.099***	7.485***	8.953***
		(0.032)	(0.572)	(0.940)
IO_DOM	0.001	0.001	0.322***	0.124***
	(0.003)	(0.006)	(0.051)	(0.040)
MSCI	0.035***			
	(0.002)			
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes
R^2	0.41			
Number of observations	37,277	37,277	34,873	37,557

Table 7

Difference-in-differences around stock additions to MSCI ACWI

This table shows results of difference-in-differences regressions of institutional ownership, long-term investment, employment, and innovation output around the time a stock is added to the MSCI ACWI. The sample includes Worldscope non-financial and non-utility firms in the 2001–2010 period. Panel A shows pre-treatment (two years before the treatment) means and medians of non-treated, treated, and control groups and tests of the difference in mean and median between treated and control groups. Treated firms consist of 574 firms added to the MSCI ACWI during the sample period. Non-treated firms are all other firms. Control firms are firms that best match treated firms using propensity scores (nearest neighbor). The dependent variables are foreign institutional ownership (*IO_FOR*), domestic institutional ownership (*IO_DOM*), the sum of capital expenditures and R&D expenditures as a fraction of assets (*CAPEX+R&D*), the logarithm of the number of employees (*LABOR*), and the logarithm of one plus number of patents applied for with the USPTO (*PATENTS*). *TREATED* is a dummy variable that equals one if a firm is added to the MSCI ACWI, and zero otherwise. *AFTER* is a dummy variable that equals one in the year a firm is added to the MSCI ACWI and thereafter, and zero otherwise. Variable definitions are provided in Table A.1 in the Appendix. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Summary statistics (pre-treatment)

	Mean				Median			
	Non-Treated	Treated	Control	*t*-test (*p*-value)	Non-Treated	Treated	Control	Pearson χ^2 (*p*-value)
CAPEX+R&D	0.092	0.080	0.075	0.07	0.048	0.063	0.062	0.62
log(1+*PATENTS*)	0.235	0.823	0.854	0.58	0.000	0.000	0.000	0.76
CLOSE	0.287	0.302	0.316	0.19	0.242	0.266	0.278	0.38
FXSALES	0.153	0.265	0.265	0.99	0.000	0.149	0.167	0.48
log(*SALES*)	11.516	14.418	14.472	0.40	11.626	14.413	14.564	0.03
log(*R&D_STOCK*)	4.085	6.109	6.089	0.93	0.000	8.486	7.789	0.34
log(*CAPITAL/LABOR*)	3.708	4.444	4.396	0.46	3.693	4.294	4.240	0.59
IO_FOR	0.025	0.072	0.072	0.89	0.001	0.039	0.033	0.01

Panel B: Difference-in-differences estimates

Dependent variable	*IO_FOR*	*IO_DOM*	*CAPEX+R&D*	*LABOR*	*PATENTS*
	(1)	(2)	(3)	(4)	(5)
TREATED × *AFTER*	0.020***	-0.005	0.005***	0.143***	0.054**
	(0.003)	(0.004)	(0.002)	(0.019)	(0.022)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
R^2	0.87	0.97	0.79	0.97	0.95
Number of observations	5,740	5,740	5,740	5,740	5,740

Table 8

External financing around stock additions to MSCI ACWI

This table shows results of difference-in-differences regressions of financial policy variables around the time a stock is added to the MSCI ACWI. The sample includes Worldscope non-financial and non-utility firms in the 2001–2010 period. Treated firms consist of 574 firms added to the MSCI ACWI during the sample period. Control firms are firms that best match treated firms using propensity scores (nearest neighbor). The dependent variables are new equity issuance (*EQ_ISSUES*), net equity issuance (*NET_EQ_ISSUES*), new debt issuance (*DEBT_ISSUES*), net debt issuance (*NET_DEBT_ISSUES*), new external financing (*EXT_FIN*), net external financing (*NET_EXT_FIN*), and change in cash holdings (Δ*CASH*); all variables are scaled by assets. *TREATED* is a dummy variable that equals one if a firm is added to the MSCI ACWI, and zero otherwise. *AFTER* is a dummy variable that equals one in the year a firm is added to the MSCI ACWI and thereafter, and zero otherwise. Variable definitions are provided in Table A.1 in the Appendix. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	*EQ_ ISSUES*	*NET_EQ_ ISSUES*	*DEBT_ ISSUES*	*NET_DEBT_ ISSUES*	*EXT_ FIN*	*NET_ EXT_ FIN*	Δ*CASH*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
TREATED × *AFTER*	-0.010***	-0.007***	0.003***	0.010***	-0.007*	0.003	-0.009***
	(0.004)	(0.003)	(0.001)	(0.003)	(0.004)	(0.004)	(0.003)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.26	0.43	0.35	0.26	0.26	0.38	0.19
Number of observations	5,740	5,740	5,740	5,740	5,740	5,740	5,740

Table 9

Type of foreign institutional ownership: investor horizon and legal origin

This table shows results of ordinary least squares (OLS) firm-level panel regressions of long-term investment, employment, and innovation output on different types of foreign institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001–2010 period. The dependent variables are the sum of capital expenditures and R&D expenditures as a fraction of assets (*CAPEX+R&D*), the logarithm of the number of employees (*LABOR*), and the logarithm of one plus the number of patents applied for with the USPTO (*PATENTS*). *IO_FOR_LT* is ownership by long-term foreign institutional investors, defined as those with portfolio turnover below the median. *IO_FOR_ST* is ownership by short-term foreign institutional investors, defined as those with portfolio turnover above the median. *IO_FOR_COMMON* is ownership by foreign institutional investors domiciled in common law countries. *IO_FOR_CIVIL* is ownership by foreign institutional investors domiciled in civil law countries. Regressions include the same control variables as those in Tables 3–5 (coefficients not shown). All explanatory variables are lagged by one period. The sample in Column 3 consists of firms with at least one patent applied for during the sample period. Variable definitions are provided in Table A.1 in the Appendix. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	*CAPEX+R&D*	*LABOR*	*PATENTS*
	(1)	(2)	(3)
Panel A: Investor horizon			
IO_FOR_LT	0.025***	0.692***	0.246**
	(0.006)	(0.063)	(0.104)
IO_FOR_ST	0.004	0.402***	0.229*
	(0.013)	(0.105)	(0.137)
IO_DOM	0.001	0.392***	0.107***
	(0.005)	(0.029)	(0.032)
Year fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
R^2	0.64	0.97	0.82
Number of observations	175,912	161,443	48,096
Panel B: Investor legal origin			
IO_FOR_COMMON	0.024***	0.632***	0.235**
	(0.007)	(0.071)	(0.111)
IO_FOR_CIVIL	0.015	0.710***	0.276
	(0.012)	(0.132)	(0.220)
IO_DOM	0.001	0.391***	0.107***
	(0.005)	(0.029)	(0.032)
Year fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
R^2	0.64	0.97	0.82
Number of observations	175,912	161,443	48,096

Table 10

Monitoring channel

This table shows results of ordinary least squares (OLS) firm-level panel regressions of long-term investment, employment, and innovation output on institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001–2010 period. The dependent variables are the sum of capital expenditures and R&D expenditures as a fraction of assets (*CAPEX+R&D*), the logarithm of the number of employees (*LABOR*), and the logarithm of one plus the number of patents applied for with the USPTO (*PATENTS*). Corporate governance is measured using the firm-level governance index (*GOV*) centered at the mean. Investor protection is measured using the anti-self-dealing index (*ANTI_SD*). Product market competition is measured using one minus the median industry Lerner index (*COMPETITION*) centered at the mean. Regressions include the same control variables as in Tables 3–5 (coefficients not shown). All explanatory variables are lagged by one period. Variable definitions are provided in Table A.1 in the Appendix. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	*CAPEX+R&D*			*LABOR*			*PATENTS*		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
IO_FOR	0.037***	0.039***	0.041***	0.658***	1.101***	1.105***	1.237***	0.556***	0.621***
	(0.011)	(0.006)	(0.006)	(0.163)	(0.109)	(0.101)	(0.193)	(0.078)	(0.083)
IO_DOM	0.006***	-0.003	-0.003	0.395***	0.735***	0.703***	0.230***	0.332***	0.330***
	(0.002)	(0.002)	(0.002)	(0.027)	(0.034)	(0.036)	(0.027)	(0.045)	(0.046)
GOV	0.019***			0.515***			0.271***		
	(0.006)			(0.040)			(0.050)		
GOV × IO_FOR	-0.249***			-3.309***			-2.880**		
	(0.036)			(1.088)			(1.303)		
ANTI_SD × IO_FOR		-0.050***			-0.883***			-1.568***	
		(0.013)			(0.329)			(0.339)	
COMPETITION × IO_FOR			0.032			0.845			-1.271***
			(0.042)			(0.521)			(0.419)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.31	0.21	0.21	0.86	0.80	0.80	0.38	0.28	0.27
Number of observations	36,957	179,125	179,125	35,263	164,510	164,510	37,061	181,173	181,173

Table 11

Human and organization capital

This table shows results of ordinary least squares (OLS) and instrumental variables (IV) firm-level panel regressions of measures of human and organization capital on institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001–2010 period. The dependent variable is the ratio of staff costs to sales (*STAFF_COST*), the logarithm of staff costs per employee (*AV_STAFF_COST*), and the ratio of selling, general, and administrative expenses to sales (*SG&A*). In the IV regressions, foreign institutional ownership is instrumented with *MSCI* (a dummy variable that equals one if a firm is a member of the MSCI ACWI in a given year, and zero otherwise). Regressions include the same control variables as those in Table 4 (coefficients not shown). All explanatory variables are lagged by one period. Variable definitions are provided in Table A.1 in the Appendix. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	*STAFF_COST*		*AV_STAFF_COST*		*SG&A*	
	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)
IO_FOR	0.128**	1.297***	0.185***	1.187***	0.282***	1.896***
	(0.060)	(0.224)	(0.053)	(0.436)	(0.052)	(0.208)
IO_DOM	0.047	0.044	0.030	0.029	0.070***	0.072***
	(0.047)	(0.064)	(0.055)	(0.040)	(0.017)	(0.020)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.70		0.91		0.82	
Number of observations	70,129	70,129	67,376	67,376	140,846	140,846

Table 12

Productivity, foreign sales, and firm valuation

This table shows results of ordinary least squares (OLS) and instrumental variables (IV) firm-level panel regressions of measures of productivity and firm valuation on institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001–2010 period. The dependent variables are the logarithm of sales (*SALES*), foreign sales as a fraction of total sales (*FXSALES*), and Tobin's *Q* (*TOBIN_Q*). In the IV regressions, foreign institutional ownership is instrumented with *MSCI* (a dummy variable that equals one if a firm is a member of the MSCI ACWI in a given year, and zero otherwise). The regression of *SALES* includes *CLOSE*, *R&D_STOCK*, *CAPITAL* (log), and *LABOR* (log) as controls (coefficients not shown). The regressions of *FXSALES* and *TOBIN_Q* include the same control variables as those in Table 3 (coefficients not shown). All explanatory variables are lagged by one year. Variable definitions are provided in Table A.1 in the Appendix. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	*SALES*		*FXSALES*		*TOBIN_Q*	
	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)
IO_FOR	0.438***	1.919***	0.076***	0.430***	1.660***	3.949*
	(0.058)	(0.380)	(0.019)	(0.132)	(0.434)	(2.054)
IO_DOM	0.341***	0.339***	0.022***	0.021***	0.250*	0.258***
	(0.043)	(0.025)	(0.008)	(0.006)	(0.138)	(0.090)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.97		0.82		0.66	
Number of observations	168,222	168,222	175,912	175,912	166,420	166,420

Table 13
Sample of non-U.S. firms

This table shows results of firm-level regressions of long-term investment, employment, and innovation output on institutional ownership using a sample of Worldscope non-U.S., non-financial, and non-utility firms in the 2001–2010 period. The dependent variable is the sum of capital expenditures and R&D expenditures as a fraction of assets (*CAPEX+R&D*), the logarithm of the number of employees (*LABOR*), and the logarithm of one plus the number of patents applied for with the USPTO (*PATENTS*). Panel A shows results of ordinary least squares (OLS) and instrumental variables (IV) panel regressions, as well as Poisson regressions in which the dependent variable is the number of patents applied for with the USPTO. In the IV regressions, foreign institutional ownership is instrumented with *MSCI* (a dummy variable that equals one if a firm is a member of the MSCI ACWI in a given year, and zero otherwise). Poisson regressions include firm fixed effects using the pre-sample mean scaling method of Blundell, Griffith, and Van Reenen (1999), and the IV estimation is implemented using the control function approach of Blundell and Powell (2004). Panel B shows results of instrumental variables (IV) firm-level panel regressions using a sample restricted to firms in the 10% bandwidth of the number of stocks around the MSCI cutoff point in each country. The cutoff point is the (free float-adjusted) market capitalization ranking of the first stock after which the index coverage is at least 85% of the free float-adjusted market capitalization in each country. Regressions include the same control variables as those in Tables 3–5 (coefficients not shown). Panel C shows results of difference-in-differences regressions around the time a stock is added to the MSCI ACWI. Treated firms consist of 379 firms added to the MSCI ACWI during the sample period. Control firms are firms that best match treated firms using propensity scores (nearest neighbor). *TREATED* is a dummy variable that equals one if a firm is added to the MSCI ACWI, and zero otherwise. *AFTER* is a dummy variable that equals one in the year a firm is added to the MSCI ACWI and thereafter, and zero otherwise. All explanatory variables are lagged by one year. The sample in Columns 5 and 6 consists of firms with at least one patent applied for during the sample period. Variable definitions are provided in Table A.1 in the Appendix. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Panel regressions

Dependent variable	*CAPEX+R&D*		*LABOR*		*PATENTS*			
					Linear model		Count model	
	OLS	IV	OLS	IV	OLS	IV	Poisson	Poisson (control function)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IO_FOR	0.012**	0.040	0.581***	3.351***	0.145	3.673***	0.753***	4.524***
	(0.005)	(0.041)	(0.062)	(0.512)	(0.110)	(1.274)	(0.143)	(0.491)
IO_DOM	0.007	0.006	0.512***	0.469***	-0.108	-0.131	1.251***	0.776*
	(0.008)	(0.006)	(0.062)	(0.056)	(0.109)	(0.144)	(0.447)	(0.413)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Firm fixed effects (pre sample)	No	No	No	No	No	No	Yes	Yes
Country fixed effects	No	No	No	No	No	No	Yes	Yes
Industry fixed effects	No	No	No	No	No	No	Yes	Yes
R^2	0.61		0.96		0.82		0.70	0.70
Number of observations	129,053	129,053	119,107	119,107	28,227	28,227	132,834	132,834

Table 13 (continued)

Panel B: Instrumental variables estimates with bandwidth

Dependent variable	First stage	IV		
	IO_FOR	*CAPEX+R&D*	*LABOR*	*PATENTS*
	(1)	(2)	(3)	(4)
IO_FOR		0.086***	6.579***	6.676***
		(0.032)	(0.585)	(0.921)
IO_DOM	0.066***	0.007	0.507***	-0.641***
	(0.022)	(0.012)	(0.179)	(0.216)
MSCI	0.041***			
	(0.003)			
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes
R^2	0.42			
Number of observations	26,158	26,158	24,224	26,401

Panel C: Difference-in-differences estimates

Dependent variable	*IO_FOR*	*IO_DOM*	*CAPEX+R&D*	*LABOR*	*PATENTS*
	(1)	(2)	(3)	(4)	(5)
TREATED × AFTER	0.029***	-0.003	0.003	0.145***	0.077***
	(0.003)	(0.004)	(0.002)	(0.026)	(0.027)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
R^2	0.86	0.97	0.75	0.97	0.94
Number of observations	3,790	3,790	3,790	3,790	3,790

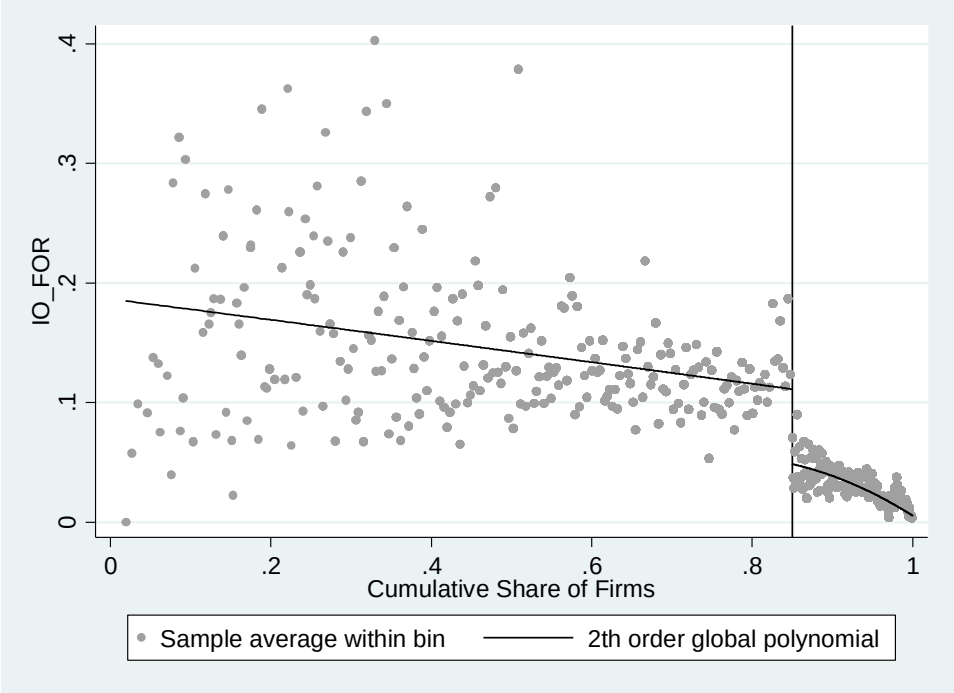
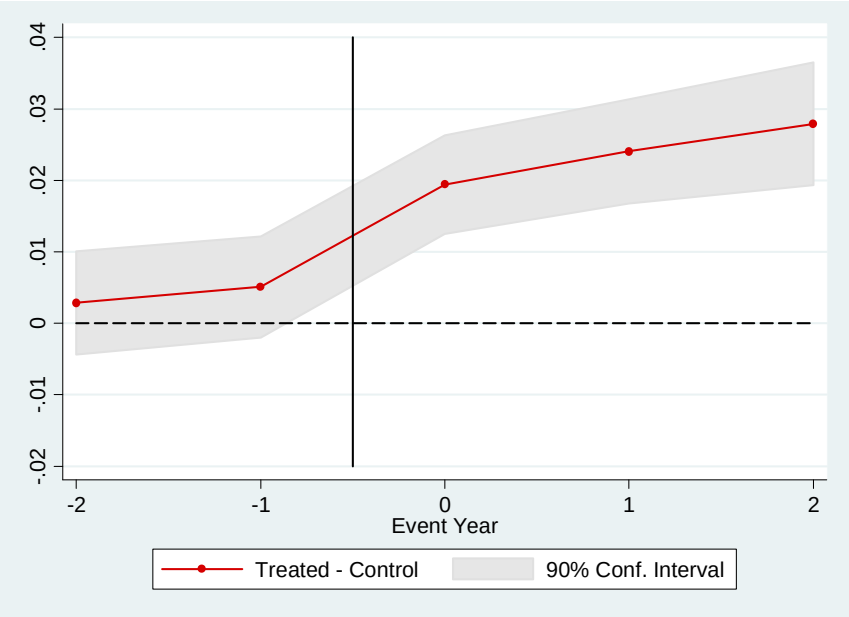


Fig. 1. Foreign institutional ownership around the MSCI ACWI cutoff point. This figure plots foreign institutional ownership (*IO_FOR*) against the cumulative share of firms. The MSCI ACWI cutoff point is the (free float-adjusted) market capitalization ranking of the first stock after which the index coverage is at least 85% of the free float-adjusted market capitalization in each country. The dots correspond to the sample means of the two variables in each bin, in which the number of bins is selected to mimic the variability of the data using the Calonico, Cattaneo, and Titiunik (2015) estimator. The solid line is a second-order polynomial estimated separately for firms above and below the cutoff ranking. The sample includes Worldscope non-financial and non-utility firms in 2009 (the final year of our sample period).

Panel A: Foreign institutional ownership



Panel B: Domestic institutional ownership

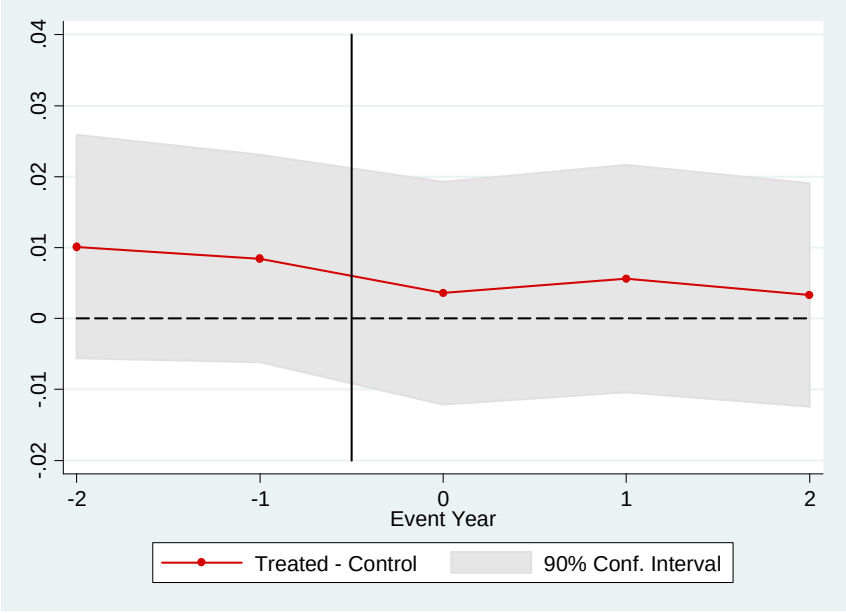
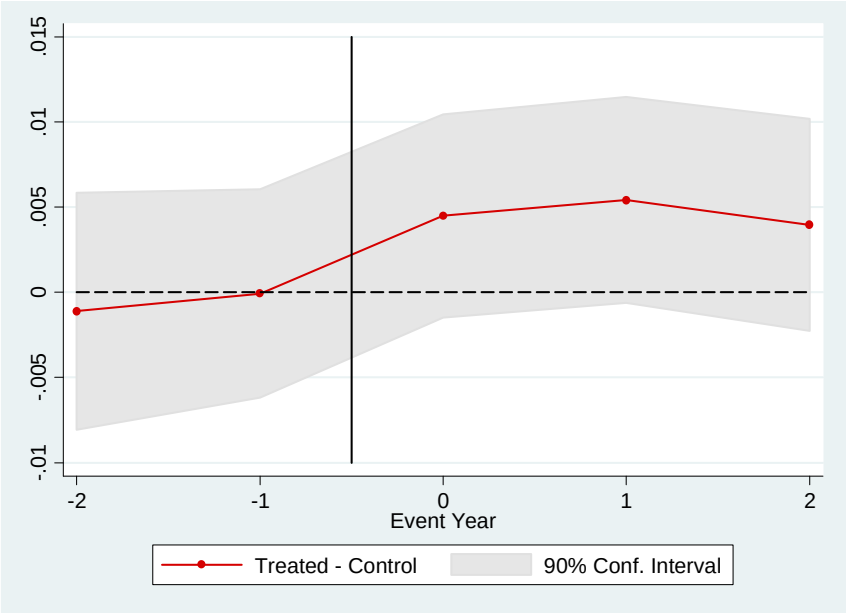
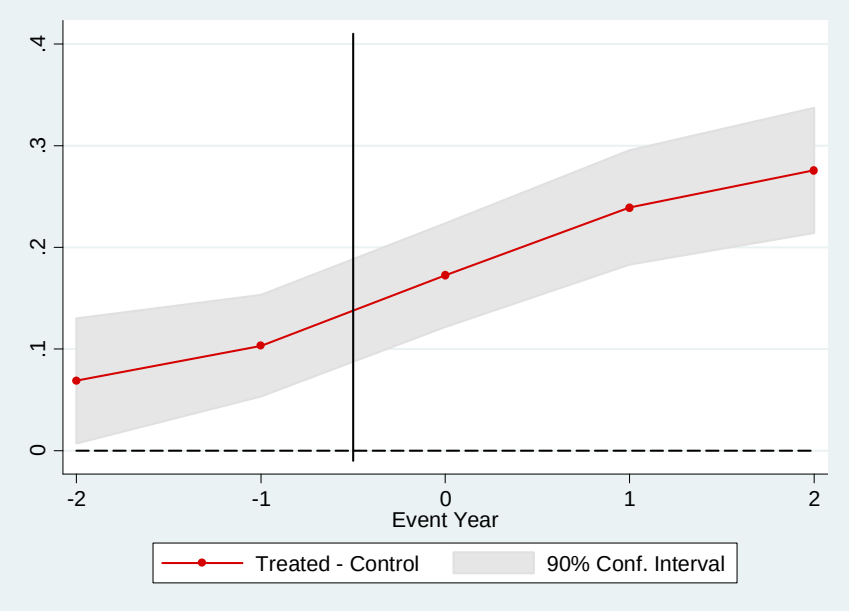


Fig. 2. Institutional ownership around stock additions to MSCI ACWI. This figure shows point estimates and 90% confidence interval of the differences in foreign institutional ownership (*IO_FOR*) and domestic institutional ownership (*IO_DOM*) between treated firms and control firms around stock additions to the MSCI ACWI (between year −1 and year 0). Treated firms consist of 574 firms added to the MSCI ACWI during the sample period. Control firms are firms that best match treated firms using propensity scores (nearest neighbor). The sample includes Worldscope non-financial and non-utility firms in the 2001–2010 period. Variable definitions are provided in Table A.1 in the Appendix.

Panel A: Long-term investment (*CAPEX+R&D*)



Panel B: Employment (*LABOR*)



Panel C: Patent count (*PATENTS*)

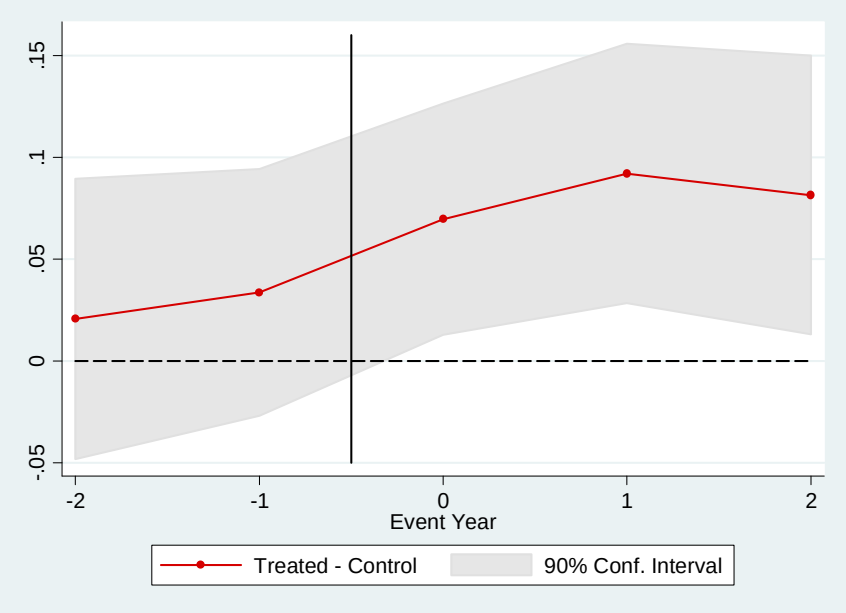
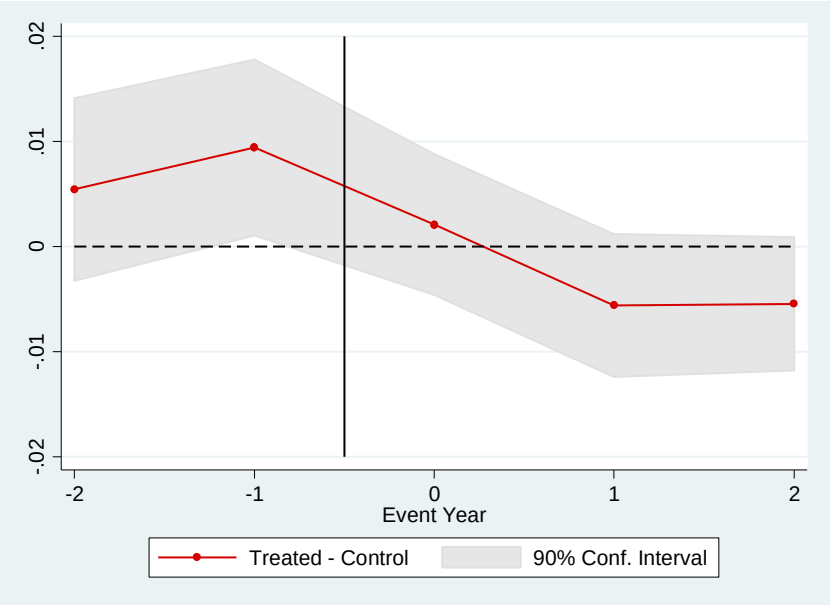
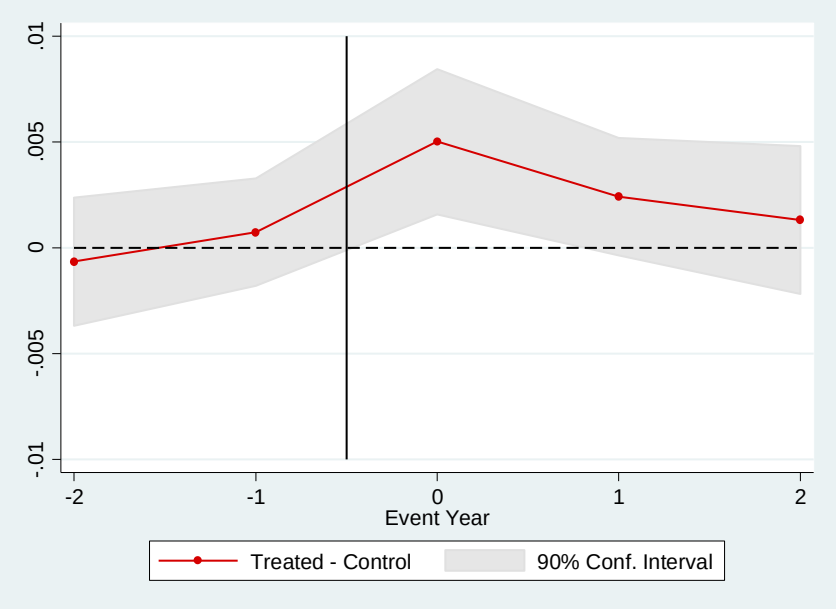


Fig. 3. Long-term investment, employment, and innovation around stock additions to the MSCI ACWI. This figure shows point estimates and 90% confidence interval of the differences in long-term investment (*R&D+CAPEX*), employment (*LABOR*), and patent counts (*PATENTS*) between treated firms and control firms around stock additions to the MSCI ACWI (between year −1 and year 0). Treated firms consist of 574 firms added to the MSCI ACWI during the sample period. Control firms are firms that best match treated firms using propensity scores (nearest neighbor). The sample includes Worldscope non-financial and non-utility firms in the 2001–2010 period. Variable definitions are provided in Table A.1 in the Appendix.

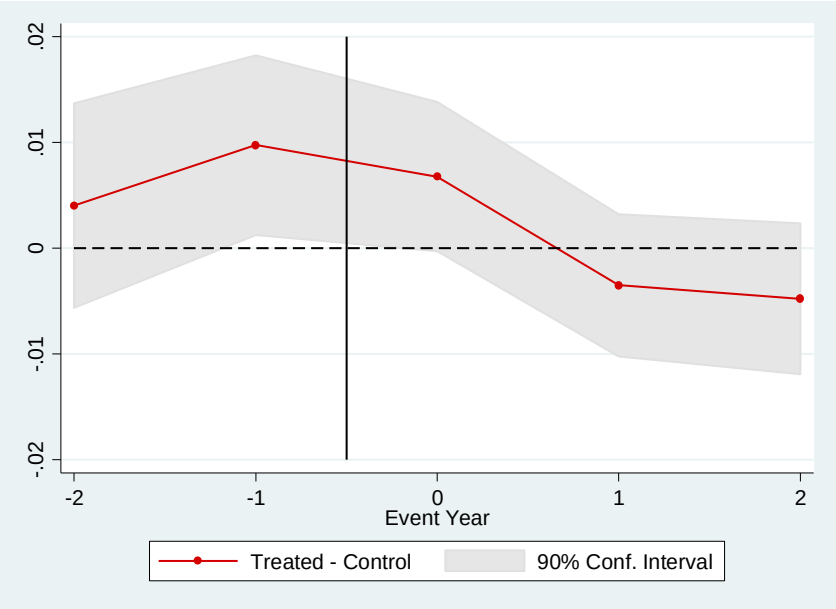
Panel A: New equity issuance (*EQ_ISSUES*)



Panel B: New debt issuance (*DEBT_ISSUES*)



Panel C: New external debt and equity financing (*EXT_FIN*)



Panel D: Change in cash holdings (Δ*CASH*)

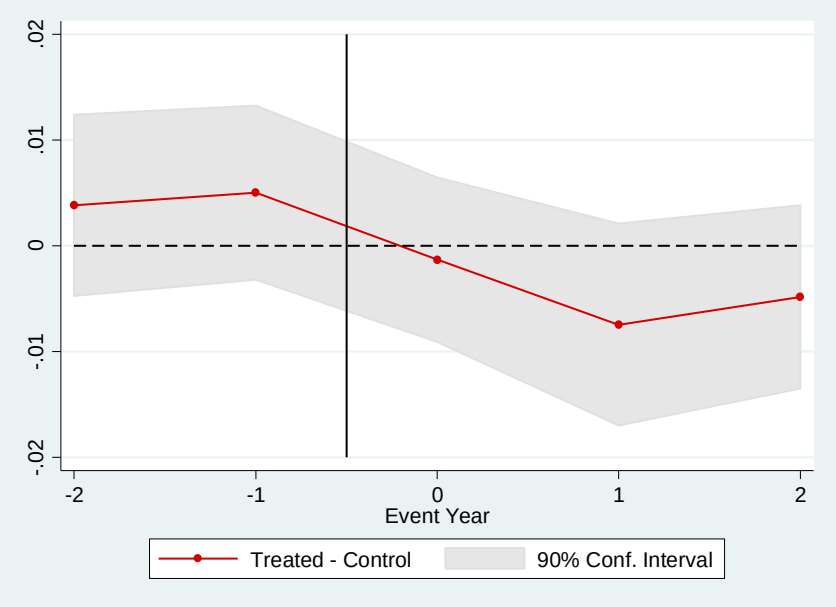


Fig. 4. External financing around stock additions to the MSCI ACWI. This figure shows point estimates and 90% confidence interval of the differences in new equity issuance (*EQ_ISSUES*), new debt issuance (*DEBT_ISSUES*), new external debt and equity financing (*EXT_FIN*), and change in cash holdings (Δ*CASH*) between treated firms and control firms around stock additions to the MSCI ACWI (between year −1 and year 0). Treated firms consist of 574 firms added to the MSCI ACWI during the sample period. Control firms are firms that best match treated firms using propensity scores (nearest neighbor). The sample includes Worldscope non-financial and non-utility firms in the 2001–2010 period. Variable definitions are provided in Table A.1 in the Appendix.

Appendix

Table A.1
Variable definitions

Variable	Definition
CAPEX+R&D	Capital expenditures (Worldscope item 04601) plus research and development expenditures (Worldscope item 01201) divided by assets (Worldscope item 02999).
CAPEX	Capital expenditures (Worldscope item 04601) divided by assets (Worldscope item 02999).
R&D	Research and development expenditures (Worldscope item 01201) divided by assets (Worldscope item 02999).
LABOR	Number of employees (Worldscope item 07011).
PATENTS	Number of patents applied for with the USPTO.
TOBIN_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.
SALES	Sales in thousands of dollars (Worldscope item 01001).
FXSALES	Foreign sales (Worldscope item 07101) divided by sales (Worldscope item 01001).
STAFF_COST	Staff costs (Worldscope item 01084) divided by sales (Worldscope item 01001).
AV_STAFF_COST	Staff costs in thousands of dollars (Worldscope item 01084) divided by the number of employees (Worldscope item 07011).
SG&A	Selling, general, and administrative expenses (Worldscope item 01101) divided by sales (Worldscope item 01001).
IO_TOTAL	Holdings (end-of-year) by all institutions as a fraction of market capitalization (FactSet/LionShares).
IO_FOR	Holdings (end-of-year) by institutions located in a different country from the country where the stock is listed as a fraction of market capitalization (FactSet/LionShares).
IO_DOM	Holdings (end-of-year) by institutions located in the same country where the stock is listed as a fraction of market capitalization (FactSet/LionShares).
IO_FOR_LT	Holdings (end-of-year) by long-term foreign institutions, defined as those with portfolio turnover below the median, as a fraction of market capitalization (FactSet/LionShares).
IO_FOR_ST	Holdings (end-of-year) by long-term foreign institutions, defined as those with portfolio turnover above the median, as a fraction of market capitalization (FactSet/LionShares).
IO_FOR_COMMON	Holdings (end-of-year) by foreign institutions domiciled in common law countries as a fraction of market capitalization (FactSet/LionShares).
IO_FOR_CIVIL	Holdings (end-of-year) by foreign institutions domiciled in civil law countries as a fraction of market capitalization (FactSet/LionShares).
CLOSE	Number of shares held by insiders (shareholders who hold 5% or more of the outstanding shares, such as officers, directors, immediate families, and other corporations or individuals), as a fraction of the number of shares outstanding (Worldscope item 08021).
CAPITAL/LABOR	Net property, plant, and equipment (Worldscope item 02501) divided by the number of employees (Worldscope item 07011).

Table A.1 (continued)

Variable	Definition
R&D_STOCK	$S_t = R_t + (1 - \delta)\, S_{t-1}$ where S_t is *R&D_STOCK* in year t, R_t is R&D expenditures in dollars in year t, and $\delta = 0.15$ is the private depreciation rate of knowledge.
FCF	Net income before extraordinary items (Worldscope item 01551) plus depreciation (Worldscope item 04049) minus capital expenditures (Worldscope item 04601) divided by assets (Worldscope item 02999).
LEVERAGE	Total debt (Worldscope item 03255) divided by assets (Worldscope item 02999).
TANGIBILITY	Net property, plant, and equipment (Worldscope item 02501) divided by assets (Worldscope item 02999).
CASH	Cash holdings (Worldscope item 02001) divided by assets (Worldscope item 02999).
GOV	Corporate governance index, defined as the percentage of 41 governance attributes for which the firm meets the minimally acceptable guidelines (RiskMetrics/ISS).
ANTI_SD	Anti-self-dealing index, which measures the strength of minority shareholder protection against self-dealing by the controlling shareholder (Djankov, La Porta, Lopez-de-Silanes, and Shleifer, 2008).
COMPETITION	One minus the Lerner index, defined as the industry (two-digit SIC) median gross profit margin (Worldscope item 08306).
EQ_ISSUES	Proceeds of new secondary equity offerings (SDC) divided by assets (Worldscope item 02999).
NET_EQ_ISSUES	Net proceeds from sale/issue of common and preferred equity (Worldscope item 04251) minus common and preferred redeemed, retired, or converted equity (Worldscope item 04751) divided by assets (Worldscope item 02999).
DEBT_ISSUES	Proceeds of new debt issues (SDC) divided by assets (Worldscope item 02999).
NET_DEBT_ISSUES	Long-term borrowings (Worldscope item 04401) minus reduction in long-term debt (Worldscope item 04701) plus the increase/decrease in short-term borrowings (Worldscope item 04821) divided by assets (Worldscope item 02999).
EXT_FIN	*EQ_ISSUES* + *DEBT_ISSUES*
NET_EXT_FIN	*NET_EQ_ISSUES* + *NET_DEBT_ISSUES*
Δ*CASH*	Change in cash and/or liquid items (Worldscope item 04452) divided by assets (Worldscope item 02999).
MSCI	Dummy variable that equals one if a firm is a member of the MSCI ACWI in a given year, and zero otherwise.

Internet Appendix to

"Are foreign investors locusts?
The long-term effects of foreign institutional ownership"

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Matching between USPTO and Worldscope

In this Appendix, we describe the algorithm we follow to match patent assignees of the patents awarded by the United States Patent and Trademark Office (USPTO) to firms in the Worldscope database for the January 1990–December 2010 period. Using historical data, for each firm in Worldscope, we compile the list of all names used by each firm currently and in the past (we use both "name" and "extended name" Worldscope variables). We also collect each firm's country of incorporation. For each patent, we obtain the set of assignees listed on the patent grant publication document issued by the USPTO. For each assignee, USPTO provides assignee country of domicile and indicates its type: U.S. corporation, non-U.S. corporation, individual, government agency, or other. We require the patent to have at least one patent assignee indicated as a U.S. firm or non-U.S. firm.

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

1. We ensure that assignee/firm name strings only contain a–z, A–Z, and 0–9 characters. That means we eliminate any diacritical marks and use only the letter. For example, we replace "â" to "a," "ü" to "u," "&Oacute" to "O," "&Uuml" to "U," "&#200" to "E." We implement 292 such character replacements. We also remove multiple-character endings included in the firm name strings in Worldscope for reasons unrelated to firm names. For example, "- ADR," "- CONSOLIDATED," "- PRO FORMA". We use 46 regular expressions to perform these removals.
2. We unify the suffixes, which typically describe the legal form of incorporation, in the assignee/firm name strings. For example, all the German suffixes for "GmbH" in any form ("G.M.B.H.," "G. M. B. H.," "g m b h," "G m b H," "G. m. b. H.," "G m. b. H") are changed to the same unified string "GMBH." We process 817 suffixes according to this scheme using regular expression language. This ensures that differences between assignee and firm name strings do not arise because of cosmetic differences in firm names. To minimize the probability

of changing a non-suffix part of the firm name by mistake, this procedure is country-specific (i.e., we make the above replacements only if the respective suffix is used by firms incorporated in a country).

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

In the second step, we create a data set that includes all pairwise combinations of standardized patent assignee name strings and standardized Worldscope firm name strings. There are 156,609 standardized Worldscope firm name strings and 405,666 standardized patent assignee name strings, leading to approximately 63.5 billion pairs. We match all assignee-firm name pairs using the Bigram string comparison algorithm. The Bigram algorithm is used to compare two strings using all combinations of two consecutive characters within each string. For example, the word "Bigram" contains the Bigram as follows: "bi," "ig," "gr," "ra," and "am." We code the Bigram comparison function to return a value between zero and one, so that it counts the total number of Bigrams that are common between the two strings divided by the average number of Bigrams in the two strings. The Bigram algorithm is effective for our purposes because it is fast and good at handling misspellings and omission of characters, as well as the swapping of words in a string.

For assignee-firm name pairs with a Bigram score above 0.5, we also compute the Levenshtein distance between the two strings. Intuitively, the Levenshtein distance between two strings is the

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

We perform extensive checks on our standardization-matching algorithm. First, we use different thresholds for the Bigram score and the Levenshtein distance to find the closest matches. Second, we eliminate suffixes from the firm name and match on the so-called stem name, instead of standardizing the suffixes of firm names. These changes, even for rather extreme parameter values, have a limited impact on the matching outcome: assignments of less than 5% of patents in our data are affected. Last, using random subsamples of patents, we manually check the results of the standardization-matching algorithm and compute type I and type II errors. We find that both types of errors are lower than 1%.

We do not have data on the list of subsidiaries owned by Worldscope (publicly listed) firms in each year. For this reason, the patent portfolio we assign to firms in our sample might be smaller than the patent portfolio these firms effectively control. These checks on the matching procedure we discuss above partially address this concern, as the names of subsidiaries are often similar to names of their parent companies; typically, they share the unique part of the name, e.g., "SIEMENS" or "LAFARGE."

For patents awarded to Worldscope firms that are incorporated in the United States, we compare the outcome of our matching algorithm with the matching provided by the NBER Patent Data Project. We first compile a link table between firm codes in Worldscope and GVKEYs in Compustat. Next, for Worldscope firms in our final sample with GVKEY, we compare the patent

count in our data with that of the NBER Patent Data Project.

Panel A of Table IA.1 provides three examples of firms with large patent portfolios: IBM, Honeywell, and Google. The table shows that, since the NBER data set is based on patents awarded by the USPTO up to 2006, the NBER data can represent innovation output (patents filed) only up to the year 2002 due to truncation bias. In contrast, we use patent grant publication documents issued by the USPTO through the end of June 2013, which allows us to have a representative measure of innovation output over our full sample period. Panel B of Table IA.1 shows, for each year in our sample, summary statistics that compare the distribution of the counts of patents in our data with that of the NBER patent data. We find that the two distributions are comparable in the 2001–2002 period during which the NBER data are available. The last column of Panel B shows that the correlation coefficient between patent counts in our data and those in the NBER data is above 0.95 in the 2001–2002 period.

Table IA.1

Comparison to NBER patent matching

This table shows the number of patent applications with the USPTO assigned to selected firms by our matching algorithm (column "Matching") and the NBER patent data (column "NBER") by year. Panel A provides three examples of firms with large patent portfolios. Panel B provides the mean, standard deviation, and 95th percentile of the number of patents assigned by the "Matching" and the NBER algorithms by year for the sample of U.S. firms. The last column reports the correlation between the numbers of patents obtained with the two matching algorithms in the 2001–2002 period during which the NBER patent data are available.

	Panel A: Examples						*Panel B: Summary statistics*								
	IBM		Honeywell		Google		Matching				NBER				Correl.
Year	Matching	NBER	Matching	NBER	Matching	NBER	Nr. of Observ.	Mean	Standard Deviation	95th	Nr. of Observ.	Mean	Standard Deviation	95th	
2001	4,016	3,456	480	487	0	0	37,856	6.38	80.11	13	40,977	6.91	73.63	14	0.96
2002	3,547	2,361	570	501	0	0	38,057	6.85	79.25	15	34,102	6.14	59.40	14	0.95
2003	3,971	1,842	593	434	0	0	36,550	7.07	87.11	14	25,724	4.98	47.91	12	
2004	3,730	802	746	286	0	2	35,857	7.40	87.85	16	12,738	2.63	24.21	6	
2005	3,731	179	822	58	178	0	35,141	7.30	88.26	15	3,246	0.67	6.24	2	
2006	3,691	6	741	3	193	0	31,906	6.76	76.00	15	182	0.04	0.37	0	
2007	5,252	0	728	0	249	0	30,722	6.59	89.41	14					
2008	6,937	0	684	0	229	0	27,117	6.02	109.29	12					
2009	2,223	0	312	0	205	0	16,258	3.88	42.53	10					
2010	807	0	140	0	165	0	8,736	2.22	19.78	7					

Table IA.2
Reduced-form regression

This table shows results of ordinary least squares (OLS) firm-level panel regressions of long-term investment, employment, and innovation output on MSCI index membership using a sample of Worldscope non-financial and non-utility firms in the 2001–2010 period. *MSCI* is a dummy variable that equals one if a firm is a member of the MSCI ACWI, and zero otherwise. Regressions include the same control variables as those in Tables 3–5 (coefficients not shown). All explanatory variables are lagged by one year. The sample in Column 3 consists of firms with at least one patent applied for during the sample period. Variable definitions are provided in Table A.1 in the Appendix. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	*CAPEX+R&D*	*LABOR*	*PATENTS*
	(1)	(2)	(3)
MSCI	0.003**	0.109***	0.097***
	(0.001)	(0.013)	(0.021)
Year fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
R^2	0.64	0.97	0.82
Number of observations	175,912	161,443	48,096

Table IA.3
Domestic institutional ownership and MSCI ACWI membership: placebo test

This table shows results of ordinary least squares (OLS) firm-level panel regressions of domestic institutional ownership on MSCI index membership using a sample of Worldscope non-financial and non-utility firms in the 2001–2010 period. *IO_DOM* is holdings by domestic institutions as a fraction of market capitalization. *MSCI* is a dummy variable that equals one if a firm is a member of the MSCI ACWI, and zero otherwise. All explanatory variables are lagged by one year. Variable definitions are provided in Table A.1 in the Appendix. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)
MSCI	-0.062***	-0.001
	(0.008)	(0.003)
CLOSE	-0.146***	-0.051***
	(0.021)	(0.003)
FXSALES	0.021***	0.005*
	(0.003)	(0.003)
log(*SALES*)	0.045***	0.015***
	(0.007)	(0.001)
log(*CAPITAL*/*LABOR*)	0.008***	0.005***
	(0.002)	(0.001)
TOBIN_Q	0.002***	0.001***
	(0.001)	(0.000)
FCF	0.019***	0.001*
	(0.004)	(0.001)
LEVERAGE	-0.040***	-0.017***
	(0.002)	(0.002)
CASH	0.104***	0.034***
	(0.016)	(0.004)
TANGIBILITY	-0.011*	-0.024***
	(0.006)	(0.005)
Year fixed effects	Yes	Yes
Firm fixed effects	No	Yes
Industry fixed effects	Yes	No
Country fixed effects	Yes	No
R^2	0.60	0.92
Number of observations	179,125	175,912

Table IA.4
Foreign institutional ownership and innovation output: non-zero patent counts

This table shows results of ordinary least squares (OLS) and instrumental variables (IV) firm-level panel regressions of innovation output on institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001–2010 period. The dependent variable is the logarithm of the number of patents applied for with the USPTO (*PATENTS*). In the IV regression, foreign institutional ownership is instrumented with *MSCI* (a dummy variable that equals one if a firm is a member of the MSCI ACWI, and zero otherwise). All explanatory variables are lagged by one year. Variable definitions are provided in Table A.1 in the Appendix. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	First stage *IO_FOR* (1)	OLS *PATENTS* (2)	IV *PATENTS* (3)
IO_FOR		0.392***	4.061***
		(0.146)	(1.240)
IO_DOM	-0.017***	0.214***	0.282***
	(0.004)	(0.052)	(0.074)
CLOSE	-0.018***	0.050	0.120**
	(0.004)	(0.046)	(0.053)
FXSALES	0.003	-0.011	-0.025
	(0.005)	(0.042)	(0.055)
log(*SALES*)	0.006***	0.085***	0.060***
	(0.001)	(0.010)	(0.015)
log(*CAPITAL*/*LABOR*)	0.002	-0.004	-0.012
	(0.001)	(0.016)	(0.016)
log(*R&D_STOCK*)	-0.000	0.017***	0.019***
	(0.000)	(0.004)	(0.005)
MSCI	0.026***		
	(0.003)		
Year fixed effects	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
R^2	0.86	0.82	
Number of observations	22,798	22,798	22,798

Table IA.5
Foreign institutional ownership and innovation output: negative binomial regression

This table shows results of negative binomial firm-level panel regressions of innovation output on institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001–2010 period. The dependent variable is the number of patents applied for with the USPTO (*PATENTS*). In the IV regression, foreign institutional ownership is instrumented with *MSCI* (a dummy variable that equals one if a firm is a member of the MSCI ACWI in a given year, and zero otherwise). Regressions include firm fixed effects using the pre-sample mean scaling method of Blundell, Griffith, and Van Reenen (1999), and the IV estimation is implemented using the control function approach of Blundell and Powell (2004). All explanatory variables are lagged by one year. Variable definitions are provided in Table A.1 in the Appendix. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	First stage *IO_FOR* (1)	Negative binomial *PATENTS* (2)	Negative binomial (control function) *PATENTS* (3)
IO_FOR		3.373***	10.511***
		(0.269)	(0.779)
IO_DOM	-0.010***	0.756***	0.945***
	(0.002)	(0.066)	(0.079)
CLOSE	-0.006**	0.540***	0.645***
	(0.003)	(0.064)	(0.063)
FXSALES	0.031***	0.228***	-0.007
	(0.003)	(0.065)	(0.070)
log(*SALES*)	0.005***	0.132***	0.055***
	(0.001)	(0.014)	(0.017)
log(*CAPITAL*/*LABOR*)	0.001***	0.045**	0.035*
	(0.000)	(0.019)	(0.019)
log(*R&D_STOCK*)	0.001***	0.146***	0.134***
	(0.000)	(0.007)	(0.007)
MSCI	0.066***		
	(0.003)		
Year fixed effects	Yes	Yes	Yes
Firm fixed effects (pre-sample)	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes
R^2	0.29	0.23	0.23
Number of observations	181,173	181,173	181,173

Table IA.6
Difference-in-differences around stock additions to MSCI ACWI: country-by-year and industry-by-year fixed effects

This table shows results of difference-in-differences regressions of institutional ownership, long-term investment, employment, and innovation output around the time a stock is added to the MSCI ACWI. The sample includes Worldscope non-financial and non-utility firms in the 2001–2010 period. Treated firms consist of 574 firms added to the MSCI ACWI during the sample period. Control firms are firms that best match treated firms using propensity scores (nearest neighbor). The dependent variables are foreign institutional ownership (*IO_FOR*), domestic institutional ownership (*IO_DOM*), the sum of capital expenditures and R&D expenditures as a fraction of assets (*CAPEX+R&D*), the logarithm of the number of employees (*LABOR*), and the logarithm of one plus number of patents applied for with the USPTO (*PATENTS*). *TREATED* is a dummy variable that equals one if a firm is added to the MSCI ACWI, and zero otherwise. *AFTER* is a dummy variable that equals one in the year a firm is added to the MSCI ACWI and thereafter, and zero otherwise. Variable definitions are provided in Table A.1 in the Appendix. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	*IO_FOR*	*IO_DOM*	*CAPEX+R&D*	*LABOR*	*PATENTS*
	(1)	(2)	(3)	(4)	(5)
TREATED × *AFTER*	0.021***	-0.005	0.006***	0.133***	0.053**
	(0.003)	(0.005)	(0.002)	(0.020)	(0.022)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Country-year fixed effects	Yes	Yes	Yes	Yes	Yes
Industry-year fixed effects	Yes	Yes	Yes	Yes	Yes
R^2	0.89	0.97	0.81	0.97	0.95
Number of observations	5,740	5,740	5,740	5,740	5,740

Table IA.7

Difference-in-differences around stock deletions from MSCI ACWI

This table shows results of difference-in-differences regressions of institutional ownership, long-term investment, employment, and innovation output around the time a stock is added to the MSCI ACWI. The sample includes Worldscope non-financial and non-utility firms in the 2001–2010 period. Treated firms consist of 167 firms deleted from the MSCI ACWI during the sample period. Control firms are firms that best match treated firms using propensity scores (nearest neighbor). The dependent variables are foreign institutional ownership (*IO_FOR*), domestic institutional ownership (*IO_DOM*), the sum of capital expenditures and R&D expenditures as a fraction of assets (*CAPEX+R&D*), the logarithm of the number of employees (*LABOR*), and the logarithm of one plus number of patents applied for with the USPTO (*PATENTS*). *TREATED* is a dummy variable that equals one if a firm is deleted from the MSCI ACWI, and zero otherwise. *AFTER* is a dummy variable that equals one in the year a firm is deleted from the MSCI ACWI and thereafter, and zero otherwise. Variable definitions are provided in Table A.1 in the Appendix. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	*IO_FOR*	*IO_DOM*	*CAPEX+R&D*	*LABOR*	*PATENTS*
	(1)	(2)	(3)	(4)	(5)
TREATED × *AFTER*	-0.019***	-0.011**	-0.002	-0.070*	-0.078**
	(0.005)	(0.005)	(0.004)	(0.040)	(0.038)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
R^2	0.93	0.96	0.77	0.95	0.91
Number of observations	1,670	1,670	1,670	1,670	1,670

Table IA.8
Monitoring channel

This table shows results of ordinary least squares (OLS) firm-level panel regressions of long-term investment, employment, and innovation output on the interaction between foreign institutional ownership and proxies for the monitoring channel using a sample of Worldscope non-financial and non-utility firms in the 2001–2010 period. The dependent variables are the sum of capital expenditures and R&D expenditures as a fraction of assets (*CAPEX+R&D*), the logarithm of the number of employees (*LABOR*), and the logarithm of one plus the number of patents applied for with the USPTO (*PATENTS*). *COMMON_LAW* is a dummy variable that equals one when a country has common law legal origin, and zero otherwise. *LOW_GDP* is a dummy variable that equals one when GDP per capita is below the median, and zero otherwise. Regressions include the same control variables as in Tables 3–5 (coefficients not shown). All explanatory variables are lagged by one year. Variable definitions are provided in Table A.1 in the Appendix. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

Dependent variable	*CAPEX+R&D*		*LABOR*		*PATENTS*	
	(1)	(2)	(3)	(4)	(5)	(6)
IO_FOR	0.069***	0.037***	1.468***	1.214***	0.981***	0.433***
	(0.006)	(0.009)	(0.107)	(0.180)	(0.179)	(0.132)
IO_DOM	-0.002	-0.003	0.747***	0.736***	0.344***	0.331***
	(0.002)	(0.002)	(0.034)	(0.034)	(0.042)	(0.044)
COMMON_LAW × IO_FOR	-0.057***		-0.732***		-0.771***	
	(0.009)		(0.193)		(0.242)	
LOW_GDP × IO_FOR		0.008		-0.131		0.301
		(0.011)		(0.216)		(0.244)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.21	0.21	0.8	0.8	0.28	0.27
Number of observations	179,125	179,125	164,510	164,510	181,173	181,173

Table IA.9

Foreign institutional ownership and long-term investment: robustness

This table shows results of ordinary least squares (OLS) firm-level panel of long-term investment on institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001–2010 period. In Columns 1–3, the dependent variable is the sum of capital expenditures and R&D expenditures as a fraction of assets (*CAPEX+R&D*). Column 1 restricts the sample to the 2005–2010 IFRS adoption period. Column 2 restricts the sample to firms with assets in excess of $10 million. In Column 3, the regression includes country-by-year and industry-by-year fixed effects. In Column 4, the dependent variable is the sum of capital expenditures and R&D expenditures as a fraction of sales. Column 5 restricts the sample to firms with positive R&D expenditures. Regressions include the same control variables as those in Table 3 (coefficients not shown). All explanatory variables are lagged by one year. Variable definitions are provided in Table A.1 in the Appendix. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
IO_FOR	0.031***	0.018***	0.021***	0.118***	0.016***
	(0.007)	(0.005)	(0.005)	(0.041)	(0.006)
IO_DOM	0.013*	-0.003	0.009**	0.032**	-0.018***
	(0.007)	(0.005)	(0.004)	(0.015)	(0.005)
Year fixed effects	Yes	Yes	No	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes
Country-year fixed effects	No	No	Yes	No	No
Industry-year fixed effects	No	No	Yes	No	No
R^2	0.70	0.66	0.65	0.52	0.79
Number of observations	111,184	160,233	175,912	175,912	74,090

Table IA.10

Foreign institutional ownership and innovation output: robustness

This table shows results of ordinary least squares (OLS) firm-level panel of innovation output on institutional ownership using a sample of Worldscope non-financial and non-utility firms in the 2001–2010 period. In Columns 1–3, the dependent variable is the logarithm of one plus the number of patents applied with the USPTO (*PATENTS*). Column 1 restricts the sample to the 2001–2008 period. Column 2 restricts the sample to firms with assets in excess of $10 million. In Column 3, the regression includes country-by-year and industry-by-year fixed effects. In Columns 4 and 5, the dependent variables are the patent counts computed over a three-year rolling window and patent counts scaled by technological class and time period, respectively. In Column 6, the dependent variable is the ratio of *PATENTS*-to-*R&D_STOCK*. In Columns 7 and 8, the dependent variables are the logarithm of one plus cite-weighted patent counts and the logarithm of one plus the number of patents applied for simultaneously with the three main patent offices (USPTO, EPO, and JPO), respectively. Regressions include the same control variables as those in Table 5 (coefficients not shown). All explanatory variables are lagged by one year. The sample consists of firms with at least one patent applied for during the sample period. Variable definitions are provided in Table A.1 in the Appendix. Robust standard errors adjusted for country-year level clustering are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
IO_FOR	0.399***	0.256**	0.253**	0.156*	0.492***	0.059**	0.275**	0.239**
	(0.112)	(0.105)	(0.097)	(0.085)	(0.132)	(0.029)	(0.132)	(0.111)
IO_DOM	0.097**	0.098***	0.135***	0.056*	0.204***	0.028**	-0.003	0.199***
	(0.039)	(0.037)	(0.022)	(0.033)	(0.049)	(0.011)	(0.041)	(0.066)
Year fixed effects	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-year fixed effects	No	No	Yes	No	No	No	No	No
Industry-year fixed effects	No	No	Yes	No	No	No	No	No
R^2	0.84	0.82	0.83	0.87	0.74	0.54	0.79	0.73
Number of observations	38,643	45,441	48,096	48,096	48,096	38,806	48,096	20,833

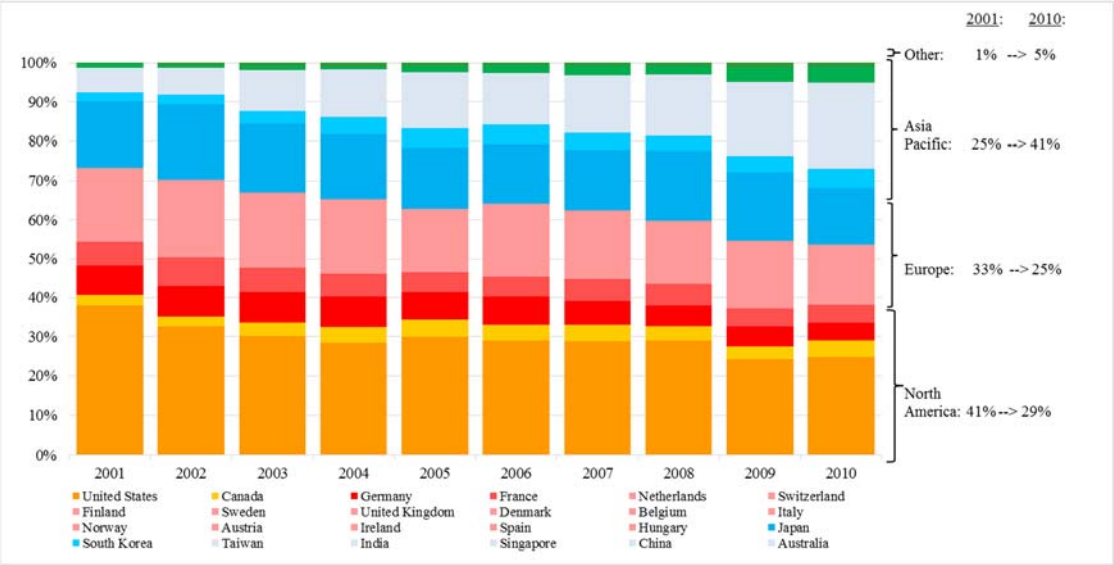
Panel A: Capital expenditures

Panel B: R&D expenditures

Panel C: Patent count

Fig. IA.1. Long-term investment and innovation output by country. This figure shows long-term investment in capital expenditures (CAPEX) in billions of dollars (Panel A), R&D expenditures in billions of dollars (Panel B), and number of patents applied for with the USPTO (Panel C) by firms domiciled in each country. The sample consists of Worldscope non-financial and non-utility firms, 2001–2010.

Panel A: Capital expenditures



Panel B: R&D expenditures

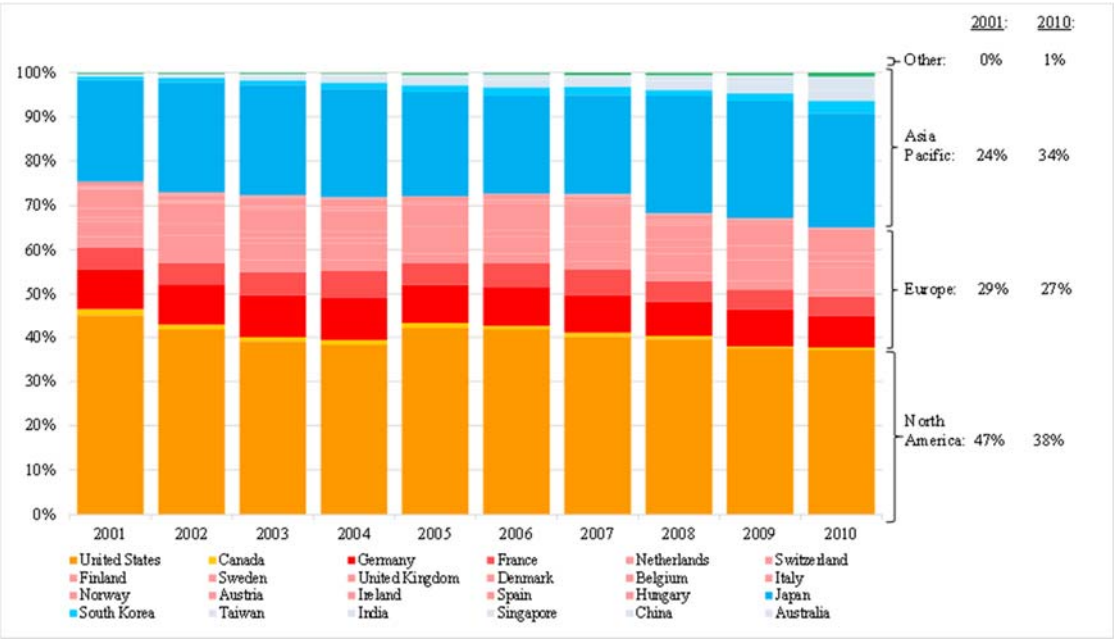


Fig. IA.2 (continued)

Panel C: Patent count

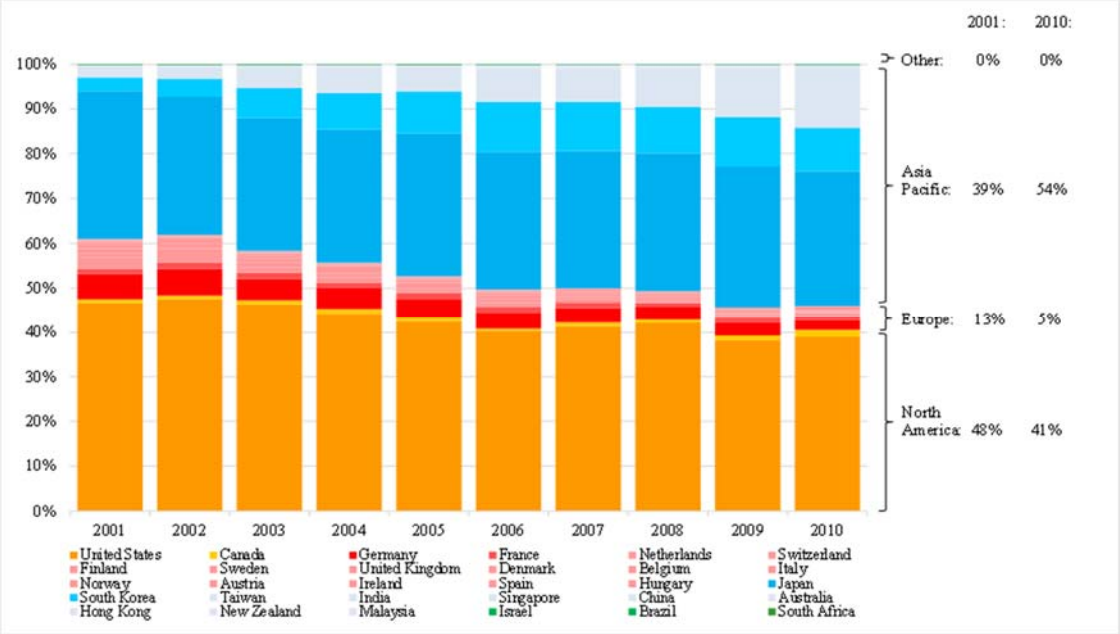
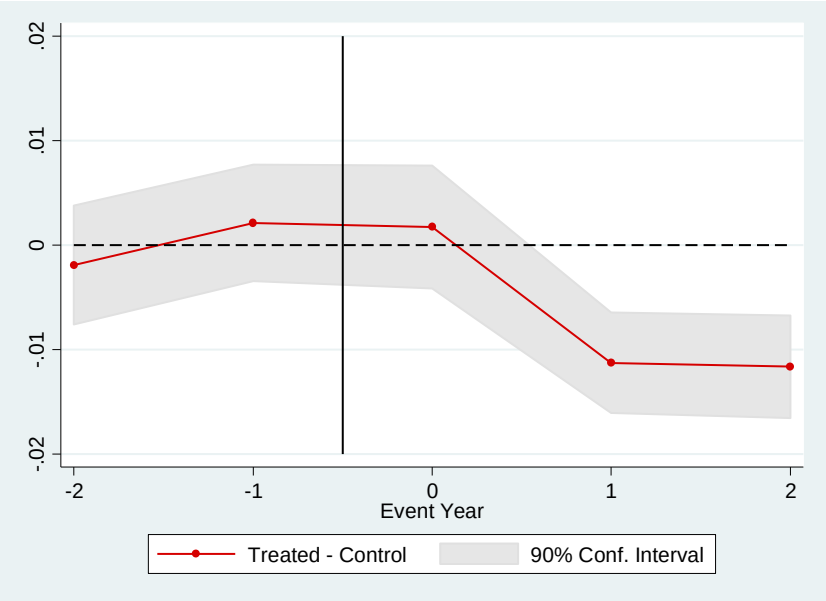


Fig. IA.2. Long-term investment and innovation output by country and year. This figure shows long-term investment in capital expenditures (CAPEX) (Panel A), R&D expenditures (Panel B), and number of patents applied for with the USPTO (Panel C) by firms domiciled in each country as a percentage of the worldwide total. The sample consists of Worldscope non-financial and non-utility firms, 2001–2010.

Panel A: Net equity issuance (*NET_EQ_ISSUES*)



Panel B: Net debt issuance (*NET_DEBT_ISSUES*)

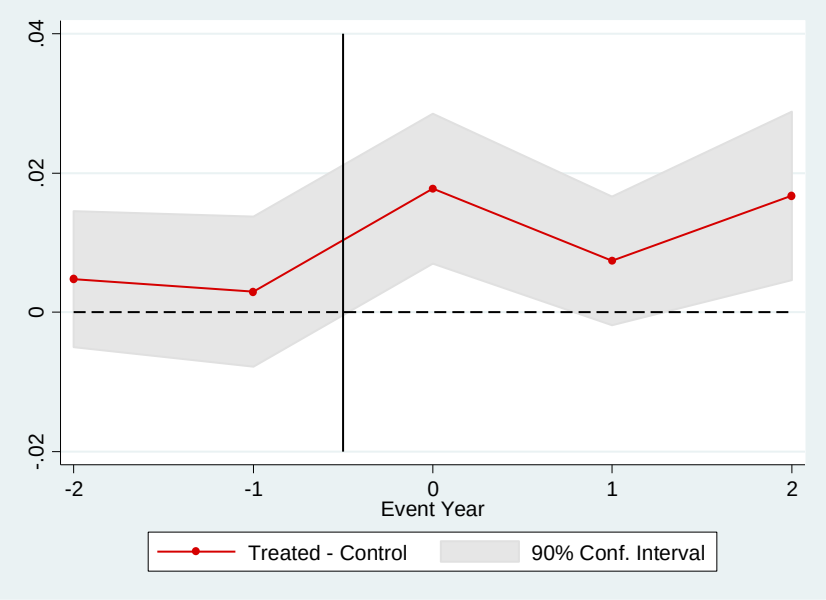


Fig. IA.3. External financing around stock additions to MSCI ACWI. This figure shows point estimates and 90% confidence interval of the differences in net equity issuance (*NET_EQ_ISSUES*) and net debt issuance (*NET_DEBT_ISSUES*) between treated firms and control firms around stock additions to the MSCI ACWI (between year −1 and year 0). Treated firms consist of 574 firms added to the MSCI ACWI during the sample period. Control firms are firms that best match treated firms using propensity scores (nearest neighbor). The sample includes Worldscope non-financial and non-utility firms in the 2001–2010 period. Variable definitions are provided in Table A.1 in the Appendix.