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BRIEFING

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TESTING "THE LOCUST HYPOTHESIS": THE IMPACT OF GLOBAL INVESTORS ON LONG-TERM INVESTMENT AND INNOVATION

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As the world economy has become increasingly globalized and complex, it's not obvious what effects foreign investors—say, Chinese investors in an American company or American investors in a British company—have on the companies whose stock they hold. Is it possible that these foreign investors provide pools of capital that firms can access in order to produce stronger companies, which make better products and services? Do these investors-from-afar monitor firms—for example, keeping managers from becoming too entrenched or engaging in value-destroying activities? Or does the opposite hold true, and do global institutional investors behave more like a swarm of locusts, resulting in short-term corporate policymaking?

As we undertook this research, we were interested in examining the effect of foreign institutional investors on long-term investments. Our goal was to investigate these questions using a comprehensive sample of companies from across the globe. Our findings for the period from 2001 to 2010 are published in our paper entitled "Are Foreign Investors Locusts? The Long-Term Effects of Foreign Institutional Ownership," in the *Journal of Financial Economics*.[1] This briefing summarizes and updates those findings, with data that now cover the period from 2001 to 2017. The graphs and maps in this briefing show the updated data.

[1] Jan Bena, Miguel A. Ferreira, Pedro Matos, and Pedro Pires, "Are Foreign Investors Locusts? The Long-Term Effects of Foreign Institutional Ownership," **Journal of Financial Economics** 126 (2017): 122–46.

THE LOCUST HYPOTHESIS

OVER RECENT DECADES, the rise of global institutional investors has led many to question whether international investors are committed to domestic companies' long-term success or are simply seeking short-term gains. In fact, in some circles, global money managers have been labeled "locusts" for their perceived plaguing effect on local companies. This label has stuck, and those who take the locust viewpoint argue that short-term-oriented, foreign money managers deprive companies of long-term success.

This "locust hypothesis" contends that foreign investors, by seeking short-term profits, push companies to:

> REDUCE CAPITAL EXPENDITURES,
>
> INVEST LESS IN RESEARCH AND DEVELOPMENT (R&D) AND INNOVATION, AND
>
> ENACT POLICIES UNFRIENDLY TO LABOR, LIKE LAYOFFS.

These concerns and criticisms reflect a broader protectionist sentiment. Are companies better off as "national champions" owned by local investors, who tend to have a lasting vested interest in local firms' success? Should continental Europe fear UK capital? Should Asian countries fear European capital?

"We support those companies who act in the interest of their future and the future 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 bare."

Franz Müntefering
CHAIRMAN OF THE GERMAN SOCIAL DEMOCRATIC PARTY, 2005.[2]

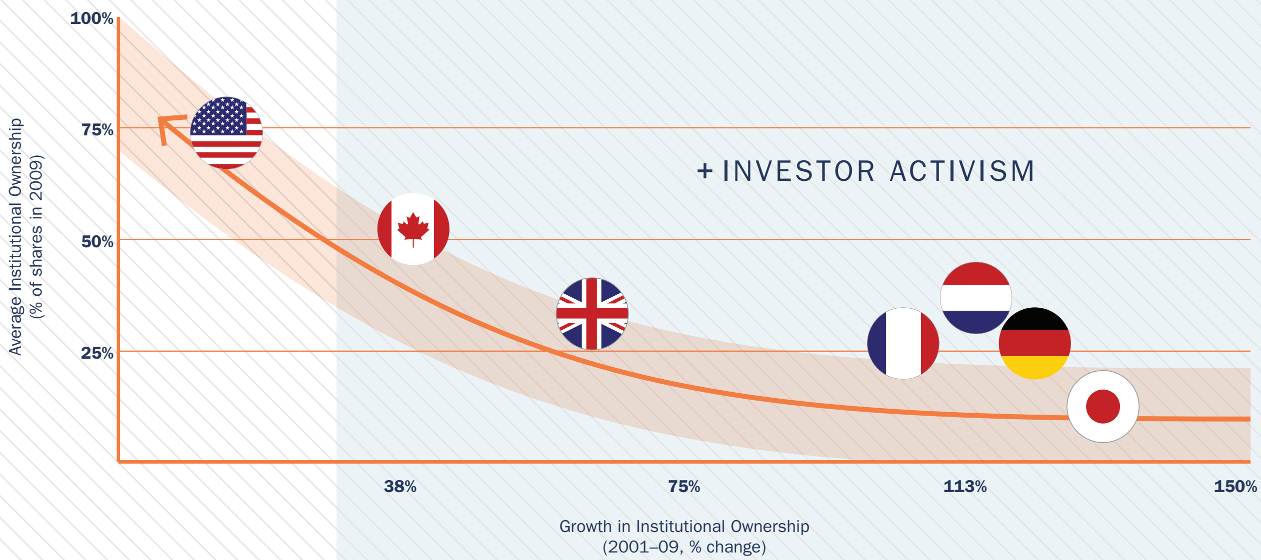
[2] In a campaign speech during the German federal election, where the analogy between the rise of global capital flows and an invasion of locusts was first made. See "Locust, Pocus," **Economist**, May 5, 2005.

THE RISE OF GLOBAL INSTITUTIONAL INVESTORS

Institutional investors, which include mutual funds, hedge funds, investment advisers, bank trusts, insurance companies, pension funds, and endowments, now hold about 40% of publicly traded shares worldwide and close to 75% of US shares.[3]

These professional money managers put household savings to work across a wider set of markets and have become crucial suppliers of capital to firms. Despite being, on average, minority shareholders, they are becoming the most influential group through their monitoring power. Besides the threat to "exit" (selling and thus depressing stock prices), institutions are becoming more active through "voice" (e.g., voting their shares, using quiet diplomacy in persuading management, or acting through confrontational proxy fights).

While institutional ownership is high but stable in the United States, it is much lower in major European and Asian countries. At the same time, institutional ownership has grown at a fast rate in the last two decades. This trend is opening European and Asian firms to investor activism. A refusal to let go of local control is hampering many companies' potential.



[3] The data source is FactSet and we developed a tool to make the data accessible to researchers. It is hosted by Wharton Research Data Services at https://wrds-web.wharton.upenn.edu/wrds/ds/factset/holdingsbyfirmmsci/index.cfm?navId=195. More details on the data can be found in Miguel A. Ferreira and Pedro Matos, "The Colors of Investors' Money: The Role of Institutional Investors around the World," **Journal of Financial Economics** 88 (2008): 499–533.

DISPELLING THE FEAR OF LOCUSTS

WE PUT THE "LOCUST HYPOTHESIS" to the test by studying the effects of foreign institutional ownership on firms' long-term policies (see opposite, "Our Approach: Data and Methodology").

Our analyses showed that the more a firm is owned by foreign investors, the more likely it is to have ***increased*** *long-term investment, measured by expenditures for R&D and capital, and* ***increased*** *innovation, measured by the number of patents.*

A correlation between foreign investors and corporate long-term investment, however, does not mean necessarily that foreign institutional ownership *causes* investment in innovation. The causal link may in fact go in the opposite direction: firms with better prospects for long-term growth or with higher potential for innovation may be more attractive to foreign investors.

Our research established that the link indeed runs from institutional investors to long-term investment and, ultimately, innovation. Our results further indicate that foreign investors affect these policies by exerting disciplinary power on entrenched business leadership, on a global scale.

Companies invest not only in tangible and intangible capital, but also in people. Calling foreign investors "locusts" characterizes those investors as unfriendly to labor, perhaps by advocating strategies like production delocalization or layoffs. In fact, our results suggest that with more foreign investment, firms actually increase the number of employees and average wage rates. In our study, we also show that firms that are owned to a larger extent by foreign investors tend to have more internationalized operations and higher shareholder value.

Companies on the whole benefit from having faraway investors, rather than solely local investors whose decision-making about a firm's future and leadership may suffer from entrenchment (e.g., promoting a family-line successor to CEO instead of the best person for the job) or bias against foreign equity.

Overall, the results of our study can help assuage anxieties that foreign institutional investors are interested more in short-term profit than in long-term stability, employment, and innovation.

OUR APPROACH: DATA AND METHODOLOGY[4]

Our first objective was to assess corporate investment around the globe over the last decade. It's challenging to measure long-term investment in today's economy, which is transitioning from brick-and-mortar businesses to knowledge-based organizations. Therefore, we took a multipronged approach. First, we examined how much companies spent on fixed capital (CAPEX) and on intangible capital (R&D). Second, we measured output from their investments by the number of patents on new technologies for which those companies applied.

The sample consisted of over 30,000 publicly listed firms across 30 countries, from 2001 to 2017. We gathered financials from the Compustat and Thomson Reuters Worldscope databases and excluded regulated industries (i.e., utilities and financial firms).

We measured long-term investment by the sum of CAPEX (the ratio of capital expenditures to total assets) and R&D (the ratio of research and development expenditures to total assets). R&D disclosure was voluntary, but the international accounting standard ("IAS 38 Intangible Assets") helped harmonize the accounting requirements for investments in intangible assets.

We measured a company's innovation output by the number of patents it filed. Using information from the United States Patent and Trademark Office (USPTO), we dated each patent by its filing date, which is closest to when the patented product or process was invented. For each patent's grant document, we identified patent assignees, nationalities of these assignees, and whether each assignee was a company; we then matched the corporate assignees to the publicly listed firms in Worldscope. This required a sophisticated matching technique. We focused on USPTO patents for several reasons: (1) the United States has a well-established patent system and law; (2) for non-US firms, USPTO patents reflect innovations whose importance justified incurring the costs of securing a US patent; (3) we validated our results using "triadic" patents (those with applications at USPTO, the European Patent Office [EPO], and the Japan Patent Office [JPO]).

We conducted a series of rigorous statistical tests involving these measures, which allowed us to determine the effect of foreign institutional investors on local companies.

[4] We are happy to make the data available to other researchers, upon request to matosp@darden.virginia.edu.

IDENTIFYING CAUSAL EFFECTS

To identify the direction of causality from foreign institutional investors to long-term investment, we examined increases in foreign institutional ownership after additions of stock to the Morgan Stanley Capital International All Country World Index (MSCI). Typically, international portfolios are benchmarked against indexes including the MSCI, so foreign institutional investors are more likely to invest in MSCI indexes' stocks.

How do we identify the causal effects using changes in foreign institutional ownership related to the addition of a stock to the MSCI? We found 574 additions to the index in the 2001 to 2010 sample period of our published paper and analyzed the two years before and after each one. For each "treated" firm that was added to MSCI, we compared it to a "control" firm that had similar characteristics but was not added. Our results showed that when a stock was added to the MSCI, foreign institutions increased their holdings by nearly three percentage points of that stock's market capitalization. Importantly, our results also showed that when treated firms' stock was added to MSCI, there was no significant increase in domestic institutional ownership, which eliminates the possibility that the addition to the MSCI was a result of positive news about the firm. Unlike control firms, the treated firms increased both their long-term investment (CAPEX plus R&D) and their patent counts after their stock additions to the MSCI.

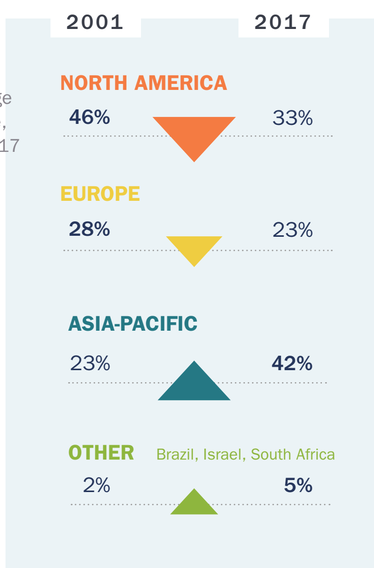
MAPPING GLOBAL INVESTMENT AND INNOVATION: A SHIFT TO THE EAST

THE GLOBAL PICTURE OF CORPORATE investment and innovation is multifaceted, as shown in the world map on the following page. Overall, these data illustrate that value-enhancing innovation activities are not exclusive to US and European firms, with an increasing number of Asian firms becoming key players in innovation.

CAPITAL EXPENDITURES (CAPEX)

Publicly listed firms invested over **$37 trillion** worldwide in CAPEX from 2001 to 2017. Overall, non-US firms outspent their US peers, but the average investment rates (ratios of CAPEX to assets) of US and non-US firms were similar, both at 5%.

CAPEX
Change in total percentage worldwide, 2001–2017



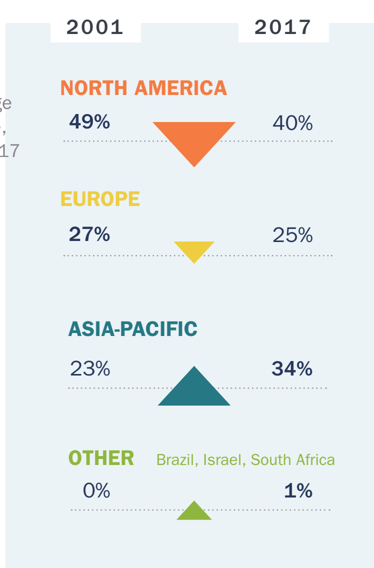
CAPEX investment is distributed around the world, but the share of Asian and Pacific firms increased significantly, from 23% to 42% of total world CAPEX between 2001 and 2017.

Car and telecommunication companies have featured in the top investing firms year after year, except during the peak years of the commodity boom in the early 2010s, when several of the top ten firms worldwide in CAPEX were in the energy sector (e.g., Petrobras, PetroChina, Dutch Shell, and Exxon).

RESEARCH & DEVELOPMENT (R&D)

From 2001 to 2017, R&D expenditures totaled **$10.7 trillion.** US firms led R&D intensity with an average ratio of R&D to assets of over 5%, the highest average worldwide and far exceeding non-US firms' average.

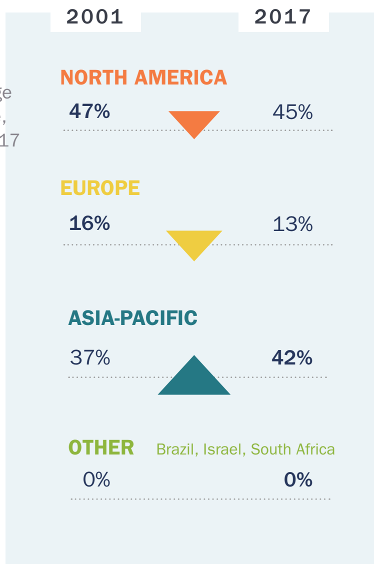
R&D
Change in total percentage worldwide, 2001–2017



International competitors have been catching up, with non-US firms' combined R&D spending ($6.4 trillion) exceeding that of US firms ($4.3 trillion) over the period. This growing trend is mainly due to the increase in innovation activities of Asia-Pacific companies, whose share of global R&D grew from 23% to 34%.

The top companies were still concentrated in North America and Europe, and while the traditional dominant sectors were health care (e.g., Roche, Pfizer) and consumer durables (e.g., Toyota), tech companies (e.g., Microsoft, Amazon, and Alphabet) were increasingly dominant as well.

Patents
Change in total percentage worldwide, 2001–2017



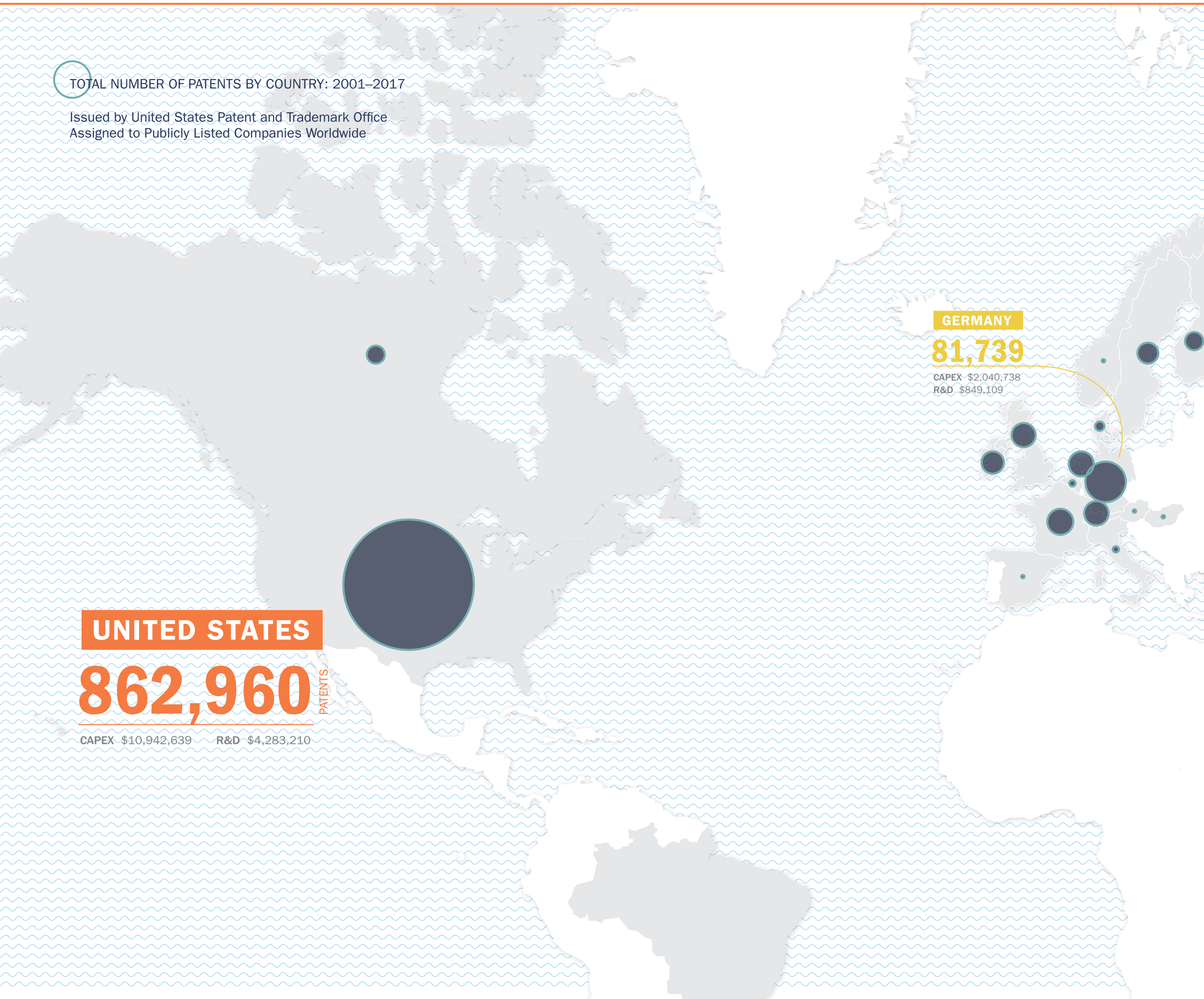
INNOVATION (PATENTS)

In all, the firms we sampled were granted close to **2 million** US patents from 2001 to 2017. The patents were well distributed across countries, illustrating the global nature of innovation.

Non-US firms filed more than half of the USPTO patents in this period. Surpassing US firms, Japanese companies had the highest number of patents per firm. Overall, European firms filed fewer patents than North American or Asian firms, although German firms produced significant innovation.

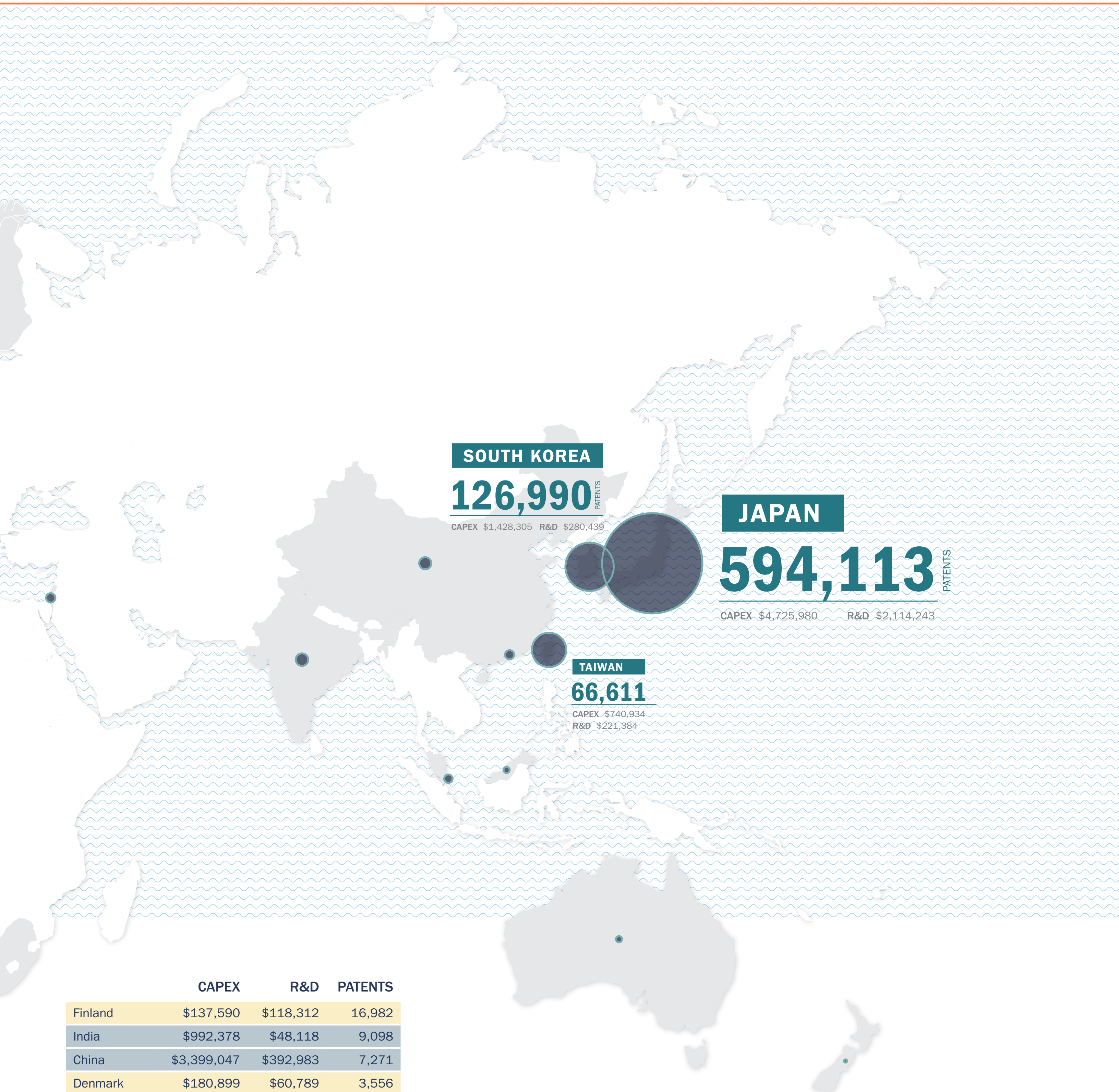
In terms of patents filed annually, IBM has been consistently the top firm in our sample. Asian firms rose notably among the top ten innovators, with a strong presence in the consumer electronics sector (e.g., Samsung, Sony, Panasonic, Hon Hai). More recently, American companies have staged a comeback, particularly those in the tech sector (e.g., Intel, Alphabet, and Qualcomm).

MAPPING GLOBAL INVESTMENT AND INNOVATION: A SHIFT TO THE EAST



The global picture of corporate investment and innovation is multifaceted. Overall, these data illustrate that value-enhancing innovation activities are not exclusive to US and European firms, with an increasing number of Asian firms becoming key players in innovation.

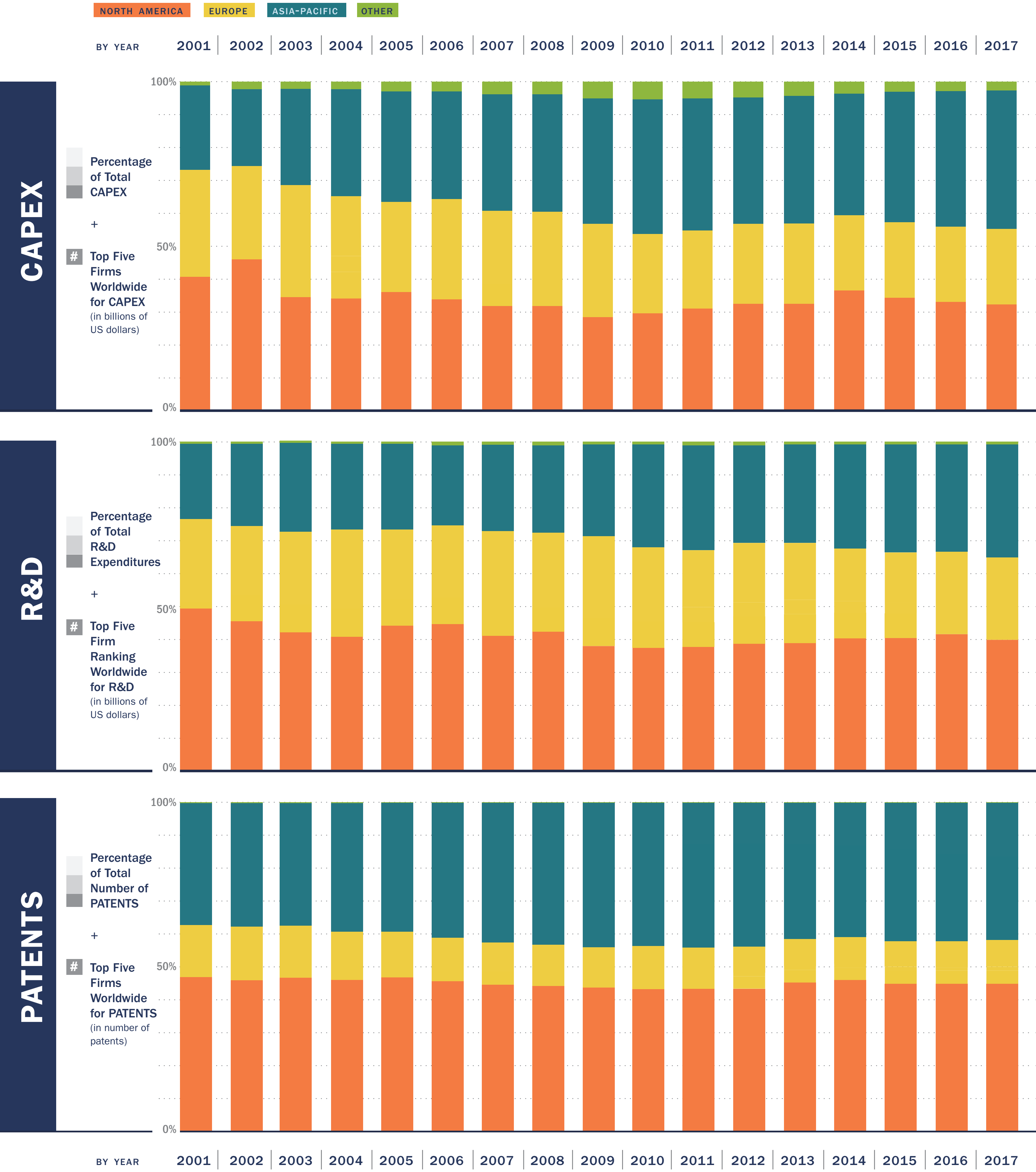
	CAPEX	R&D	PATENTS
United States	$10,942,639	$4,283,210	862,960
Japan	$4,725,980	$2,114,243	594,113
South Korea	$1,428,305	$280,439	126,990
Germany	$2,040,738	$849,109	81,739
Taiwan	$740,934	$221,384	66,611
Netherlands	$881,304	$213,232	30,237
United Kingdom	$2,080,475	$479,753	29,199
Switzerland	$534,202	$416,955	27,721
France	$1,543,080	$468,646	26,854
Ireland	$231,314	$130,774	23,717
Sweden	$286,855	$177,839	18,672
Canada	$1,587,379	$89,654	17,030



	CAPEX	R&D	PATENTS
Finland	$137,590	$118,312	16,982
India	$992,378	$48,118	9,098
China	$3,399,047	$392,983	7,271
Denmark	$180,899	$60,789	3,556
Israel	$102,911	$48,120	2,983
Singapore	$266,509	$10,420	2,946
Hong Kong	$1,081,993	$51,478	2,480
Italy	$569,231	$99,812	1,525
Belgium	$171,213	$43,841	1,109
Australia	$809,286	$26,165	1,101
Norway	$424,420	$16,504	781

	CAPEX	R&D	PATENTS
Austria	$135,553	$14,488	280
New Zealand	$49,469	$2,946	238
South Africa	$294,640	$4,129	179
Spain	$526,116	$21,459	168
Malaysia	$216,012	$4,629	1
Hungary	$32,667	$2,439	0

CAPITAL EXPENDITURES, RESEARCH & DEVELOPMENT, AND INNOVATION: 2001–2017



NORTH AMERICA	EUROPE	ASIA-PACIFIC	OTHER
United States, Canada	Germany, France, Netherlands, Switzerland, Finland, Sweden, United Kingdom, Denmark, Belgium, Italy, Norway, Austria, Ireland, Spain, Hungary	Japan, South Korea, Taiwan, India, Singapore, China, Australia, Hong Kong, New Zealand, Malaysia	Israel, Brazil, South Africa

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	GM USA, $27	Daimler DEU, $26	Daimler DEU, $28	Daimler DEU, $33	Daimler DEU, $32	Daimler DEU, $41	Toyota JPN, $28	Dutch Shell NLD, $35	PetroChina CHN, $38	Petrobras BR, $45	PetroChina CHN, $43	PetroChina CHN, $50	PetroChina CHN, $50	PetroChina CHN, $49	Toyota JPN, $36	Toyota JPN, $32	Samsung E KOR, $40
2	Daimler DEU, $24	GM USA, $24	GM USA, $19	GM USA, $22	GM USA, $24	GM USA, $25	BMW DEU, $26	PetroChina CHN, $32	Petrobras BR, $35	PetroChina CHN, $39	Petrobras BR, $40	Petrobras BR, $40	Petrobras BR, $45	Chevron USA, $35	PetroChina CHN, $34	GM USA, $29	PetroChina CHN, $35
3	Verizon USA, $17	NTT JPN, $14	NTT JPN, $17	Toyota JPN, $18	Toyota JPN, $24	Ferrovial ESP, $24	Dutch Shell NLD, $25	Petrobras BR, $30	Dutch Shell NLD, $27	Dutch Shell NLD, $27	Exxon M USA, $31	Exxon M USA, $34	Dutch Shell NLD, $40	Petrobras BR, $35	Chevron USA, $30	China Mobile CHN, $27	Toyota JPN, $34
4	GE USA, $16	Toyota JPN, $13	Toyota JPN, $14	BMW DEU, $16	Dutch Shell NLD, $16	Toyota JPN, $24	PetroChina CHN, $24	BMW DEU, $27	Exxon M USA, $22	Exxon M USA, $27	Chevron USA, $27	Dutch Shell NLD, $33	Chevron USA, $38	Exxon M USA, $33	China Mobile CHN, $27	PetroChina CHN, $26	China Mobile CHN, $30
5	NTT JPN, $15	GE USA, $13	Exxon M USA, $13	NTT JPN, $15	BMW DEU, $16	Dutch Shell NLD, $23	Daimler DEU, $23	Toyota JPN, $24	BP GBR, $21	Toyota JPN, $20	Dutch Shell NLD, $26	Chevron USA, $31	Exxon M USA, $34	Dutch Shell NLD, $32	Exxon M USA, $26	AT&T USA, $22	GM USA, $28

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	Ford USA, $7	Ford USA, $8	Pfizer USA, $12	Sanofi FRA, $10	Pfizer USA, $9	Pfizer USA, $8	Toyota JPN, $10	Toyota JPN, $9	Roche CHE, $10	Merck USA, $11	Novartis CHE, $10	VW DEU, $12	Samsung E KOR, $14	Samsung E KOR, $14	VW DEU, $13	Amazon USA, $16	Amazon USA, $23
2	GM USA, $6	Daimler DEU, $6	Ford USA, $8	Pfizer USA, $9	Ford USA, $8	Johnson & Johnson USA, $8	Johnson & Johnson USA, $8	Lilly USA, $9	Microsoft USA, $9	Toyota JPN, $11	Toyota JPN, $9	Samsung E KOR, $11	VW DEU, $14	VW DEU, $14	Samsung E KOR, $13	Alphabet USA, $14	Alphabet USA, $17
3	Siemens DEU, $6	GM USA, $6	Daimler DEU, $7	Microsoft USA, $8	Toyota JPN, $7	Toyota JPN, $8	Pfizer USA, $8	Pfizer USA, $9	Nokia FIN, $8	Roche CHE, $11	VW DEU, $9	Roche CHE, $10	Intel USA, $11	Intel USA, $12	Amazon USA, $13	Intel USA, $13	Samsung E KOR, $16
4	Daimler DEU, $5	Siemens DEU, $6	Toyota JPN, $6	Daimler DEU, $8	GM USA, $7	Ford USA, $7	Nokia FIN, $8	Merck USA, $9	Pfizer USA, $8	Pfizer USA, $10	Pfizer USA, $9	Intel USA, $10	Roche CHE, $10	Microsoft USA, $11	Alphabet USA, $12	Samsung E KOR, $12	VW DEU, $14
5	Bristol-M S USA, $5	Toyota JPN, $6	Siemens DEU, $6	Ford USA, $7	Daimler DEU, $7	Daimler DEU, $7	GM USA, $8	Nokia FIN, $8	VW DEU, $8	VW DEU, $9	Microsoft USA, $9	Microsoft USA, $10	Microsoft USA, $10	Roche CHE, $10	Intel USA, $12	VW DEU, $12	Intel USA, $13

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	IBM USA,3440	IBM USA,3326	IBM USA,3478	IBM USA,3347	IBM USA,3029	IBM USA,3683	IBM USA,3187	IBM USA,4192	IBM USA,4914	IBM USA,5893	IBM USA,6176	IBM USA,6483	IBM USA,6843	IBM USA,7555	IBM USA,7377	IBM USA,8135	IBM USA,3412
2	NEC JPN,2050	Hitachi JPN,1990	Hitachi JPN,2367	Panasonic JPN,2222	Panasonic JPN,1992	Hitachi JPN,2694	Samsung E KOR,2771	Samsung E KOR,3587	Samsung E KOR,3880	Samsung E KOR,4943	Samsung E KOR,5348	Samsung E KOR,5587	Samsung E KOR,5953	Samsung E KOR,6509	Samsung E KOR,6939	Samsung E KOR,7548	Samsung E KOR,2815
3	Canon JPN,1923	Canon JPN,1954	Panasonic JPN,2051	Hitachi JPN,2169	Hitachi JPN,1960	Panasonic JPN,2613	Hitachi JPN,2348	Hitachi JPN,2359	Microsoft USA,2903	Microsoft USA,3080	Panasonic JPN,2968	Sony JPN,3538	Canon JPN,3879	Canon JPN,4109	Canon JPN,4197	Canon JPN,3725	Canon JPN,1268
4	Panasonic JPN,1745	NEC JPN,1937	Canon JPN,2049	Canon JPN,1856	Canon JPN,1865	Samsung E KOR,2493	Panasonic JPN,2191	Canon JPN,2128	Panasonic JPN,2405	Panasonic JPN,3015	Hitachi JPN,2931	Canon JPN,3220	Sony JPN,3327	Sony JPN,3425	Alphabet USA,3201	Alphabet USA,3210	Intel USA,1190
5	Micron USA,1727	Micron USA,1858	Micron USA,1721	HP USA,1784	HP USA,1807	Canon JPN,2413	Canon JPN,2024	Microsoft USA,2024	Hitachi JPN,2325	Hitachi JPN,2947	Canon JPN,2848	Panasonic JPN,3143	Panasonic JPN,2958	Microsoft USA,2837	Qualcomm USA,3026	Intel USA,3090	LG KOR,1102

2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017

TAKEAWAYS FOR CORPORATE LEADERS

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THE INTERNATIONALIZATION OF FIRMS' investors strengthens firms by helping them build capital, be more productive, and compete more effectively in the global economy. Our study suggests that foreign capital is not the predator force imagined by some to threaten "national champions." The best pathway for firms as suggested by our findings is not economic nationalism, but an attitude open to international portfolio investment. Foreign investment is a positive force in the economy: it helps firms create more jobs, develop innovative technologies, and design new products and services.

Corporate leaders should consider implementing the following:

RECOGNIZE THE VALUE OF GLOBAL CAPITAL and be willing to welcome foreign shareholders. Avoid instinctual bias and give these investors a good, hard look. Not every foreign investor is going to help you, just as not every local one will. But companies will benefit by not discriminating against shareholders purely based on their nationalities.

PRIORITIZE INVESTOR RELATIONS. Nurturing relationships with shareholders becomes all the more critical when those shareholders are dispersed around the globe. Getting to know your investors means an outlay of company time and expense. Ultimately these are resources well-spent, as they help weed out the true "locusts" while building trust with investors and creating a shared vision, which, in turn, encourage longer-term investment and greater profits.

A change in attitude toward foreign investment may be uncomfortable at times, but in the long run, our analysis shows that it's to firms' advantage to welcome it.

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