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Chinese Multinationals Gaining Global Dominance

Lourdes Casanova, Senior Lecturer, Gail and Rob Cañizares Director Emerging Markets Institute, Cornell University (United States)
lc683@cornell.edu
https://orcid.org/0000-0003-3524-1499

Anne Miroux, Faculty Fellow, Emerging Markets Institute, Cornell University (United States)
am2449@cornell.edu
https://orcid.org/0000-0002-6091-5267

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Corresponding author: **Lourdes Casanova** | lc683@cornell.edu.

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Chinese Multinationals Gaining Global Dominance

Abstract

Chinese firms have become key players in the global economy. Their rise is a defining feature since the turn of the century. In this paper, we analyze the ascent of Chinese firms in global business, the factors behind their emergence and how they have disrupted the global competitive landscape. Through the empirical study of large samples of firms and the help of databases like Capital IQ, FdI Markets and SDC Platinum, the paper examines the revenue growth and global expansion of Chinese firms– highlighting, among others, trends in geographical and sectoral distribution and modes of entry in foreign markets. The paper pays also particular attention to the rise of Chinese firms as global innovators and includes several cases studies in key industries. The paper concludes that while Chinese firms' global expansion benefited from a favorable global environment, the current trade wars and geopolitical tensions, may be more challenging.

Keywords: Chinese Multinationals, Internationalization, Mergers and Acquisitions, Greenfield investments, Foreign Direct Investment, global business, Innovation

Multinacionals xineses guanyant preponderància mundial

Resum

Les empreses xineses s'han convertit en actors clau de l'economia global. El seu ascens és un tret definitori des del tombant de segle. En aquest article, analitzem l'ascens de les empreses xineses en els negocis globals, els factors que expliquen la seva aparició i com han alterat el panorama competitiu mundial. Mitjançant l'estudi empíric de grans mostres d'empreses i l'ajuda de bases de dades com Capital IQ, FdI Markets i SDC Platinum, el document examina el creixement dels ingressos i l'expansió global de les empreses xineses, destacant, entre d'altres, les tendències en la distribució geogràfica i sectorial i els modes de penetració en els mercats exteriors. El document també presta especial atenció a l'augment de les empreses xineses com a innovadores globals i inclou diversos estudis de casos en indústries clau. El document conclou que, si bé l'expansió global de les empreses xineses es va beneficiar d'un entorn global favorable, les guerres comercials i les tensions geopolítiques actuals poden suposar més dificultats.

Paraules clau: Multinacionals xineses, internacionalització, fusions i adquisicions, inversions noves, inversió estrangera directa, negoci global, innovació

Multinacionales chinas ganando preponderancia mundial

Resumen

Las empresas chinas se han convertido en actores clave de la economía global. Su ascenso es una característica definitoria desde principios de siglo. En este artículo analizamos el ascenso de las empresas chinas en los negocios globales, los factores detrás de su surgimiento y cómo han alterado el panorama competitivo global. A través del estudio empírico de grandes muestras de empresas y la ayuda de bases de datos como Capital IQ, FdI Markets y SDC Platinum, el documento examina el crecimiento de los ingresos y la expansión global de las empresas chinas, destacando, entre otras cosas, las tendencias en la distribución y los modos geográficos y sectoriales. de entrada en los mercados exteriores. El documento también presta especial atención al ascenso de las empresas chinas como innovadoras globales e incluye varios estudios de casos en industrias clave. El documento concluye que, si bien la expansión global de las empresas chinas se benefició de un entorno global favorable, las actuales guerras comerciales y tensiones geopolíticas pueden ser más desafiantes.

Palabras clave: Multinacionales Chinas, Internacionalización, Fusiones y Adquisiciones, Inversiones Greenfield, Inversión Extranjera Directa, negocios globales, Innovación

中国跨国企业迈向全球主导地位

摘 要

中国企业已经成为全球经济的关键参与者。自世纪之交以来，中国企业崛起已成为这个时代的显著特征。本文分析了中国企业在全球商务领域的发展，其背后的驱动因素，以及它们如何重塑了全球竞争格局。通过大量企业样本的实证研究，并借助于 Capital IQ、FdI Markets 和 SDC Platinum 等数据库，本文详细考察了中国企业的营收增长及其全球扩张 —— 尤其突出了它们的地域和行业分布趋势，以及进入国际市场的方式。此外本文还特别关注了中国企业作为全球创新者的崛起，并包含了多个关键行业的案例研究。本文的结论指出，在中国企业的全球扩张得益于有利全球环境的同时，当前日益加剧的贸易争端与地缘政治紧张局势可能为其带来更多挑战。

关键词：中国跨国企业，国际化，兼并收购，绿地投资，外国直接投资，全球商务，创新

Introduction

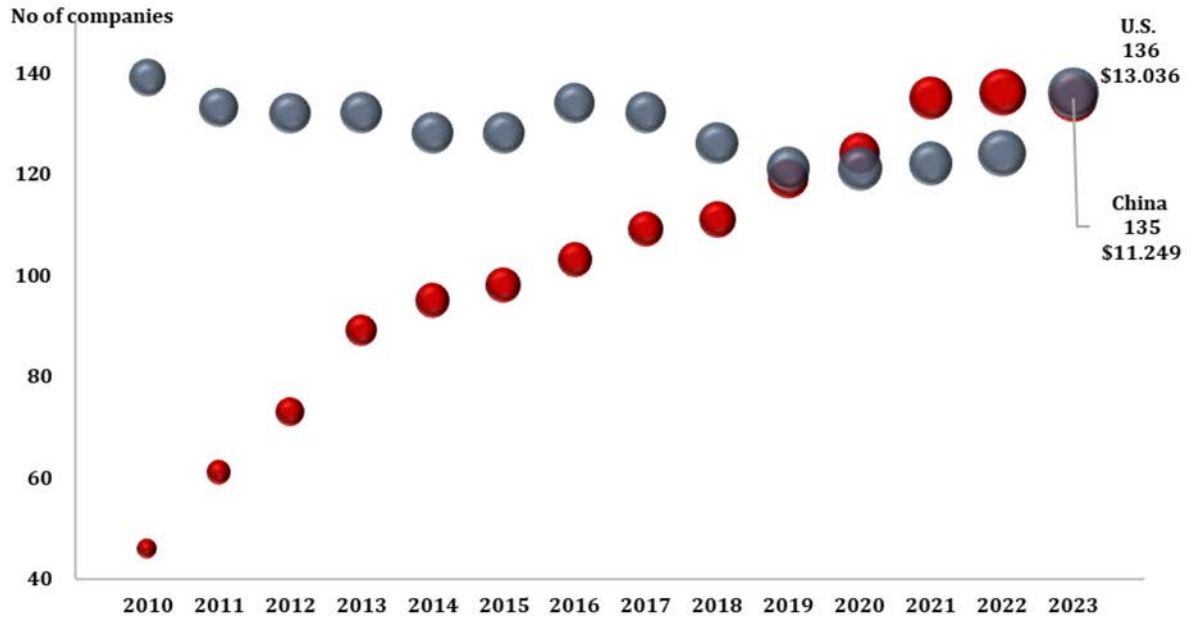
This paper builds on the research done by Casanova and Miroux on Chinese multinationals since 2015 published in the previous EMI reports and in the book The Era of Chinese Multinationals (Casanova and Miroux 2020b). The main goal of this paper is to look at the evolution of Chinese Multinationals in the last 20 years, focusing on their growth in revenues, international expansion and strides in Research and Development and Innovation.

The surge of Chinese firms in global business

The rise of Chinese firms in the Fortune Global 500 is a vivid illustration of the major changes in global business that has taken place over the past two decades. Established in 1990 by Fortune magazine, the Fortune Global 500 ranks companies worldwide based on their annual revenues. From 16 in 2004, the number of Chinese firms in the ranking rose to 135 in 2023. Chinese firms broke into the global scene in the aftermath of the 2008 Global Financial crisis, tripling their presence in the past decade alone (Figure 1) and matching what Japan, France, Germany, and the UK together account for. In 2021 and 2022, the number of Chinese firms in the Fortune Global 500 even exceeded that of the US firms. While American firms in general are consistently ranked higher, Chinese firms are not concentrated in the lower positions, and the gap in size between the companies in both groups on average is small, a big achievement given the fact that Chinese firms are relative newcomers in global business.

While the US and China have virtually the same number of firms in the Fortune Global 500, there is a difference between both groups in term of revenues and profits (Table 1). The

Figure 1. Number of US companies versus Chinese in Fortune Global 500, 2010-2023



Sources: EMI Research Team based on Fortune Global 500 (https://fortune.com), accessed in August 2023.

difference is particularly marked in the latter: the total profits of Chinese firms are half of those of US firms.

The largest Chinese firms have more employees (19% more) and bigger assets (23% more) than their US counterparts, indicative of a lower efficiency and profit margin on average for Chinese firms. Analyzing data on profits and revenues of US and Chinese firms operating in the same sector and with comparable revenues

Table 1. Fortune Global 500: Number of companies and total revenues, profits, employees and assets (2023)

Country	Number of companies	Total Revenues (USD)	Total Profits (USD)	Total Employees	Total Assets (USD)
United States	136	13,035,959	1,088,272	19,193,819	38,934,446
China	135	11,248,734	527,977	22,835,520	48,077,633
Japan	41	2,773,826	131,081	4,774,972	14,695,397
Germany	30	2,491,166	103,315	5,139,004	6,159,171
France	24	1,707,892	75,515	3,759,155	12,180,758
Korea, Rep.	18	1,138,825	54,445	971,806	2,447,126
United Kingdom	15	1,274,333	137,120	1,964,084	6,476,646
Canada	14	654,243	82,554	1,134,499	6,060,018
Switzerland	11	757,741	68,869	970,653	2,470,494
Netherlands	10	667,567	47,906	1,360,887	1,657,165
Brazil	9	532,670	76,246	772,995	1,803,712
Spain	8	421,534	34,768	727,279	3,073,551
India	8	596,185	26,097	876,871	1,686,940
Taiwan, China	7	494,358	33,894	1,224,769	404,139
Italy	5	446,511	25,601	395,980	2,270,691
Ireland	3	126,648	15,763	891,800	183,432
Denmark	3	163,567	32,933	180,763	121,551
Russian Federation	3	257,558	22,002	1,039,661	935,417
Singapore	3	431,711	9,854	174,814	182,864
Mexico	3	194,743	9,971	650,377	239,319
Australia	2	115,628	36,654	236,983	118,141
Austria	1	65,523	3,897	22,308	60,210
Indonesia	1	84,888	3,807	33,596	87,811
Sweden	1	46,828	3,236	94,921	60,369
Saudi Arabia	1	603,651	159,069	70,496	663,541
Norway	1	150,806	28,746	21,936	158,021
Thailand	1	96,162	2,604	30,628	98,832
Turkey	1	54,467	4,216	114,677	84,577
Poland	1	62,326	7,520	64,494	62,060
Belgium	1	57,786	5,969	166,632	212,943
Colombia	1	37,547	7,435	18,903	62,548
Luxembourg	1	79,844	9,302	154,352	94,547
Malaysia	1	85,365	20,999	49,771	161,493

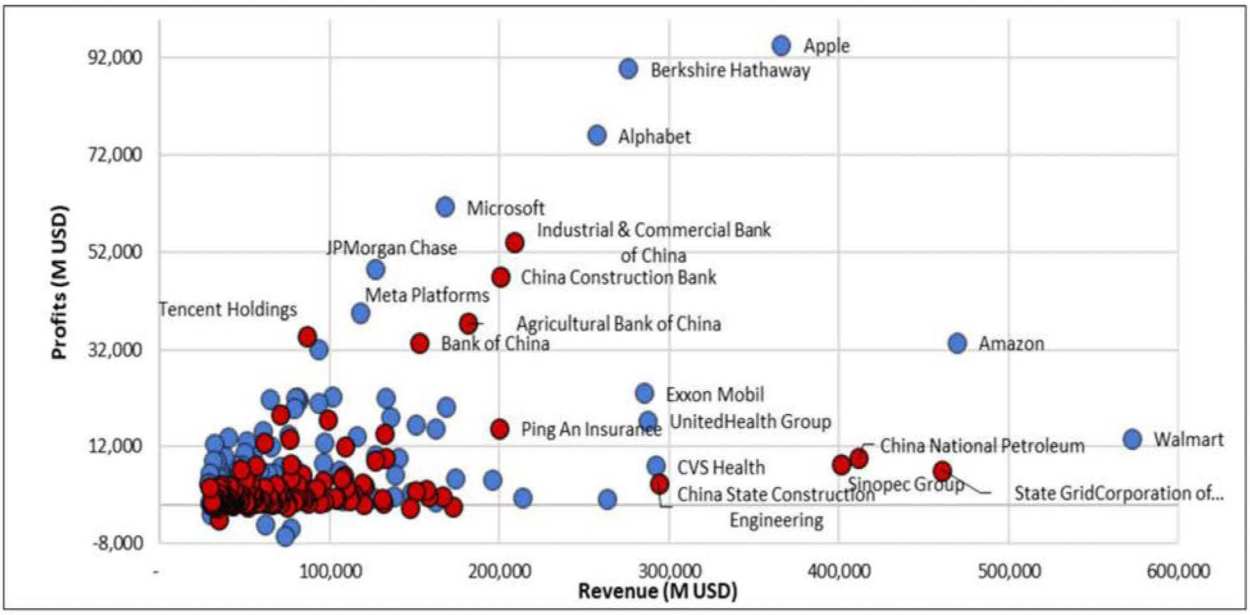
Sources: Authors based on data from 2023 Fortune Global 500 https://fortune.com/ranking/global500/ accessed by September 2024

in 2022 confirms this observation: Chinese firms have in general a lower profit margin than their US peers (Figure 2). The only exception is banking, owing to the strong support of the government to Chinese banks, many of which are fully or partially state-owned. However, the difficulties of the real estate and construction sector, partly due to the COVID19 lockdowns and the economic slowdown in China, have caused significant increases in bad debts and may substantially affect Chinese banks' financial performance. The return on assets of Chinese firms in certain sectors is also lower than that of their US peers, as illustrated in Figure 3, suggesting Chinese EMNCs are not as efficient as their US competitors in using their large asset bases to generate sales.

Overall, the lower profit and efficiency performance of large Chinese firms can be explained by the prevalence of fully or partially State-owned firms in the Chinese economy, and the policy constraints imposed on such firms as a result—for instance, to create and preserve employment. The tight competition in many sectors of the Chinese market and the relatively low purchasing power of most of the population, keeping pressure on prices, also plays a role. A stronger domestic economy, growing interest in high-tech development, and increasing brand recognition may help improve Chinese firms' performance in the future.

Extending the analysis beyond the Fortune Global 500 to include a broader set of firms with revenues exceeding USD 1 billion, China leads with the largest number of what the Emerging Markets Institute calls "billionaire firms",[1] followed by the United States, Japan, Korea, and the United Kingdom (Figure 4). With an estimated 2,054 billionaire companies in 2023, China accounts for 26 % of the world total. The USA has 1,546 firms, and the two are well ahead of the third country in the ranking,

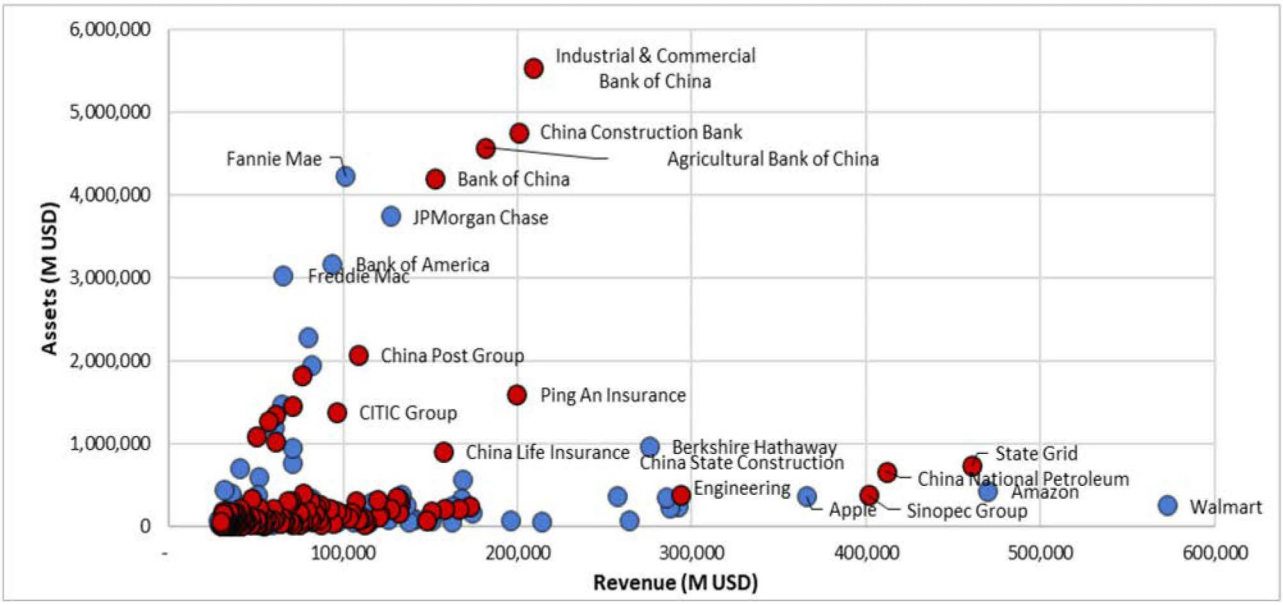
FIGURE 2. PROFITS VERSUS REVENUE OF US AND CHINESE COMPANIES IN FORTUNE GLOBAL 500, 2022



Sources: EMI research team based on Fortune Global 500 data (https://fortune.com/), data accessed in August 2022. .

[1] The list of billionaire firms is established based on data from S&P Capital IQ.

FIGURE 3. ASSETS VERSUS REVENUE OF US AND CHINESE COMPANIES IN FORTUNE GLOBAL 500, 2022



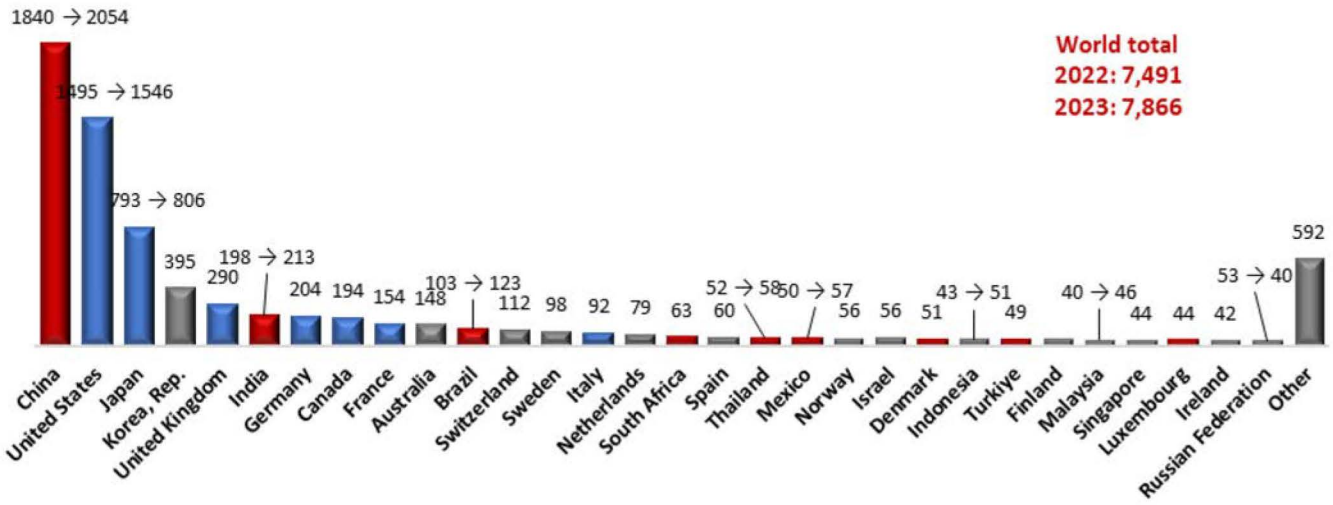
Sources: EMI research team based on Fortune Global 500 data (https://fortune.com/), data accessed in August 2022.

Japan (806). China's number of billionaires far exceeds that of other emerging economies: India, the second among this group of economies, has only 213 such firms, a respectable number by global standards but far below that of China and the USA.

In contemporary economies, large firms—like billionaire companies—have a crucial role to play. They possess the ability to continually fund innovation and build ecosystems that support small and medium-sized businesses (SMEs), generate revenue, and create jobs. Because of their ability to upend sectors through technical innovation and operational efficiency, they are major agents of change, impacting the development trajectories of nations. They have the ability to draw large sums of money from institutional and individual investors as well as from governments looking to harness their economic clout. They often serve as the engines of their country's economy, reflecting and driving the nation's economic power and growth. They are a source of inspiration for entrepreneurs, adeptly negotiate unstable political and economic landscapes, and have a significant impact on world events. Their dominance, however, begs concerns about the distribution of income and monopolistic power.

The biggest Chinese companies in terms of revenues span various industries. The largest one, State Grid Corporation of China (SGCC), a state-owned electric utility, is the third biggest company in the world by revenues (after the American Wal-Mart and the Saudi Aramco). SGCC plays a crucial role in China's energy sector by managing its extensive electricity distribution network (Table 2). It is the world's biggest utility company by far, with operations in many countries including Brazil, Chile, Portugal, Australia, Philippines, Italy, Greece, Oman and Pakistan (Appendix 1).

FIGURE 4. NUMBER OF BILLIONAIRE FIRMS IN 30 TOP COUNTRIES (2023 AND 2022)



Sources: EMI research team based on S&P Capital IQ (https://www.capitaliq.com/), accessed in July 2023.

The top Chinese firms list also includes oil and gas players like China National Petroleum and China Petrochemical Corporation, the second and third largest Chinese firms, and the fifth and sixth largest in the world, (table 2). These are vertically integrated businesses that are involved in the exploration, production, refining, and marketing of energy resources. The top Chinese billionaire firms also include companies that specialize in construction and heavy equipment. China Construction Engineering Corp., ranked fourth among the top Chinese firms (table 2), is one of the biggest players in the construction and engineering

TABLE 2. FIVE TOP CHINESE COMPANIES IN 2023

Rank in the Fortune Global 500	Billionaire	Country	Latest Annual Revenue* (USDMM)
3	State Grid Corporation of China	China	516,912
5	China National Petroleum Corporation	China	492,955
6	China Petroleum and Chemical Corporation (SINOPEC)	China	488,150
13	China State Construction Engineering Corp.	China	297,955
63	China Communications Construction Group (Ltd.)	China	271,652

*2023 or latest data available

Note: there are discrepancies between data from Fortune Global 500 and Capital IQ - partly due to differences in data collection methodology – that may lead to divergences in rankings based on revenue.

Sources: EMI research team based on S&P Capital IQ (https://www.capitaliq.com/), accessed in July 2023. Revenues data may differ from the one in the Fortune Global 500 ranking.

industry in the world and a contributor to China's extensive infrastructure development and international projects - in Africa for instance. Another notable example of China's strategic investments in critical sectors is China Communication Construction Group, which also plays a significant role in infrastructure construction, particularly in transportation and telecommunication projects. These businesses demonstrate the power of China's state-owned enterprises (SOEs) but private firms such as Ping An, the largest insurance provider in the world, and Hon Hai in China (Foxconn in Taiwan), Apple's largest supplier, also feature among China's largest companies. All of these Chinese multinational corporations are billionaire businesses. They support China's economic expansion, benefit from it, and have a significant impact on numerous industries worldwide.

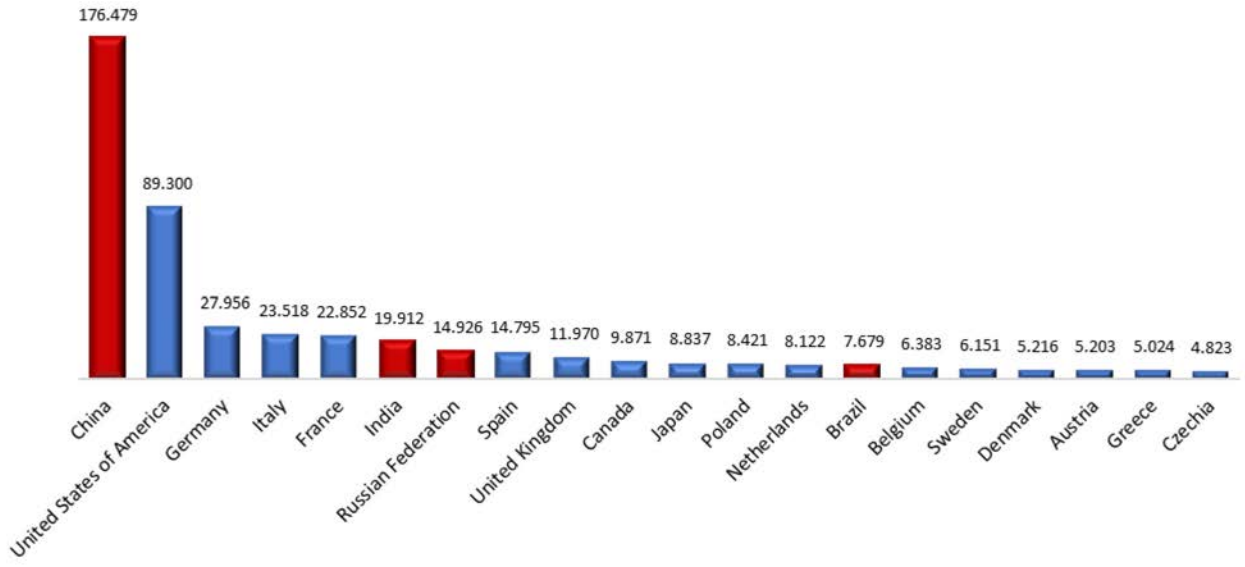
Behind the rise of Chinese multinationals

Several factors have fueled the ascent of Chinese firms in global business. Primarily, China's economic expansion, coupled with the size and dynamisms of its consumer market, has been pivotal in propelling Chinese firms to leading positions in global business. The exponential growth in China's population, soaring from USD 980 million in 1980 to USD 1.4 billion in 2023, alongside rapid economic strides over the past two decades, have engendered a vast and rapidly expanding domestic market providing a solid foundation for Chinese firms to grow and develop new products and services. According to the World Bank, China's Gross Domestic Product (GDP) per capita surged from USD 960 in 2000 to USD 12,720 in 2022. Its middle class has been swelling from 39 million individuals in 2000, equivalent to 3% of the population, to 707 million by 2018, according to the Center for Strategic and International Studies (China Power Team 2017). Across many sectors, China leveraged its large domestic market to build production capacity, enabling companies to leapfrog foreign competition. Recent examples include electric vehicles, solar panels, and battery production.

The role of the government in the Chinese economy stands as another crucial factor behind the rise of Chinese firms. As of 2020, 85% of the top 100 Chinese companies were either fully or partially state-owned, while there was only one state-owned entity (USPS, the United States Postal Service) among the top 100 US firms (Casanova and Miroux 2020a). Moreover, various policies and measures aimed at fostering growth and innovation in industries deemed strategic for national development have provided strong support to Chinese enterprises. Such support, consistently and resolutely pursued over the years has been instrumental in the emergence of global leaders from China. Recent initiatives like "Made in China 2025" have played a key role in positioning China as a major player in critical sectors such as electric vehicles, and semiconductors. The two five-year plans adopted since then—the 13th (2016-2020) and the ongoing 14th (2021-2025)—intricately aligned with the "Made in China" initiative, have also been aimed at propelling China's economic and technological development.

Among the tools used by the Chinese government to foster growth and innovation in targeted industries, subsidies have been prominent. A study by the Singapore-based Hinrich Foundation (Wei 2023) estimates the number of subsidies deployed by China over 2008-Q1 2023 at 176,479, the largest number in the world, followed by the United States with 89,300 subsidies (figure 5). Far below, comes the number three, Germany, with 27,956. The Chinese subsidies span a wide variety of sectors, and 95% take the form of financial

FIGURE 5. NUMBER OF CORPORATE SUBSIDIES BY COUNTRY 2008-2023Q1



Sources: Authors based on data from Global Trade Alert, Corporate Subsidy Inventory 2.1 (https://www.globaltradealert.org/) accessed in November 2023.

grants to companies. By comparison, in the case of the United States 14 % of the subsidies are productions subsidies, while in Germany 30% of subsidies are in the form of state loans (Wei Yap 2023).

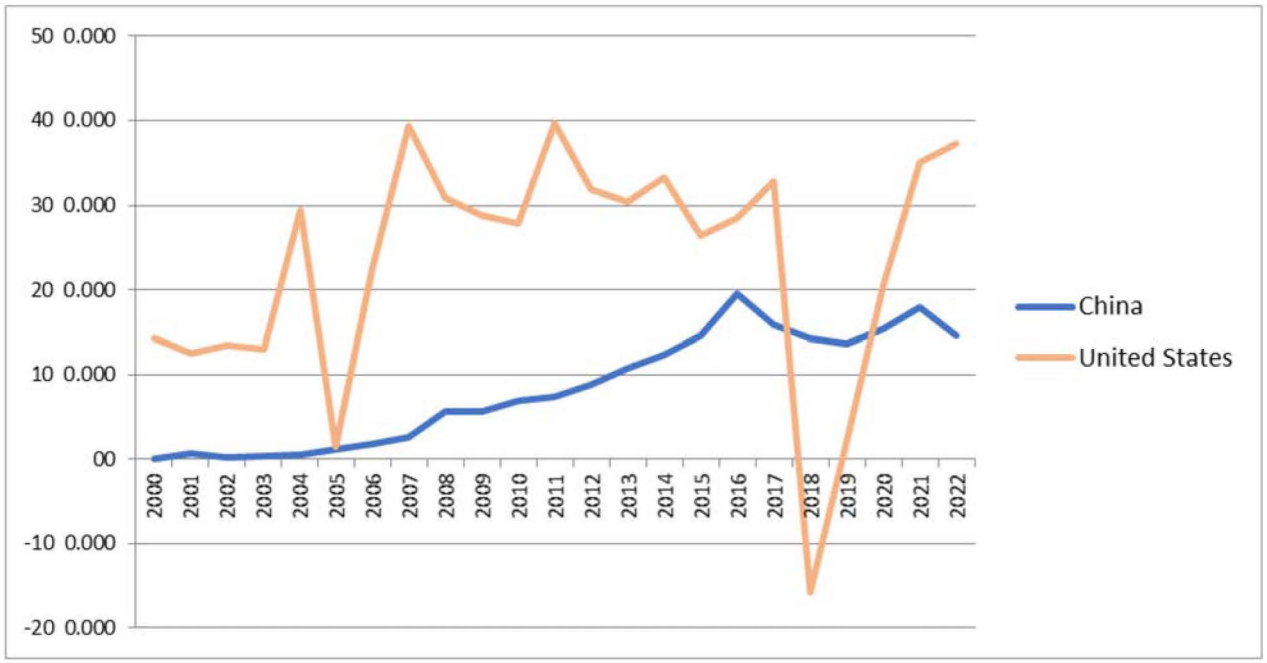
The Chinese government has also played a major role in the internationalization of Chinese firms, starting in 2000 with the launch of the "Go Global" strategy. Over the years, it has continued actively encouraging the overseas expansion of Chinese firms, with particular emphasis on investment in technology sectors (Casanova and Miroux 2020b). Among emerging economies, China has been one of the most pro-active in promoting outward Foreign Direct Investment. The influence of the government, however, does not manifest only in the encouragement of overseas expansion: the Chinese government has also adopted a series of measures aimed at monitoring and scrutinizing outward foreign direct investment, in particular outbound mergers and acquisitions as seen in the next section.

Chinese firms expanding abroad: a pause after the heydays?

As they grew in size and strength, supported by the policies of the Chinese government, Chinese firms have increasingly ventured abroad through Greenfield Foreign Direct Investments and Mergers and Acquisitions (M&As) and profoundly transformed the international investment landscape.

Hardly visible at the beginning of the 21st century in the global investment landscape—with less than 2% of global outflows—, China became in 15 years one of the largest global investors: in 2016, it became the second largest global investor after the United States, according to UNCTAD data. That year, China represented 13% of global FDI outflows, and the United States 19%. In the following years, Chinese multinationals' share in global investment fluctuated between 10% and a peak of 21% in 2020. According to the Chinese Ministry of Commerce (MOFCOM) as of 2023 China had 29 000 domestic investors with

FIGURE 6. FDI OUTFLOWS, CHINA AND THE UNITED STATES, 2000-2022 (USD MILLIONS)



Sources: Authors based on UNCTAD Stat (http://unctadstat.unctad.org/), accessed March 2024.

operations abroad (branches, subsidiaries or affilates) (MOFCOM, 2023).

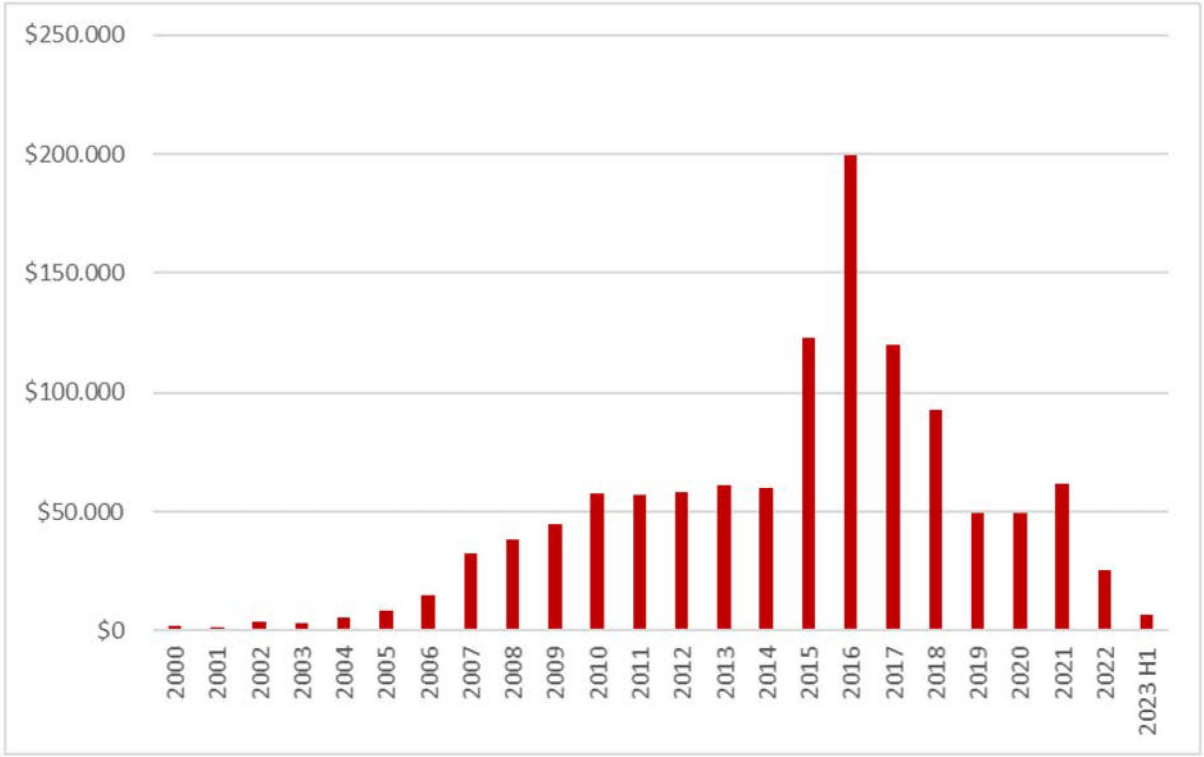
As it did for the growing number of Chinese enterprises (Figure 1), the Global Financial Crisis marked a turning point in the foreign expansion of Chinese multinationals (Figure 6). While between 2000 and 2007 Chinese outward FDI flows rose from USD 1 to 26 billion, by 2016 they had reached almost USD 200 billion. Since then, Chinese Outward Foreign Direct Investment (OFDI) has slowed down. This reversal in the trend is due to a less open global environment, marked by increasing constraints and scrutiny on inward FDI in major markets, such as the United States and Europe. The Covid crisis and a slowing down of the Chinese economy have also played a role.

The peak in OFDI observed in the mid-2010s reflected a surge in cross border acquisitions by Chinese multinationals (Figure 7). In value terms, announced cross-border M&As by Chinese firms exceeded announced Greenfield FDI projects (i.e. projects where the investor builds facilities like sales offices, production plants, etc. from the ground up) (Figure 8). Mergers and Acquisitions increased massively, as Chinese firms, less affected by the Global Financial Crisis, could acquire financially distressed firms from advanced economies. Many Chinese enterprises went into what one could describe as a frenzy of acquisitions. The Chinese airline firm Hainan Airlines (HNA) exemplifies this trend with acquisitions in a wide array of upstream and downstream industries (aircraft maintenance, leasing, logistics, hotels and real estate) and beyond. In 2015-2016, its acquisitions alone accounted for an estimated 13% of Chinese overseas M&As (Casanova and Miroux 2020b). Other major Chinese overseas acquirers during that period included the conglomerates Wanda and Fosun, and Anbang Insurance for instance. By the late 2010s, however, Chinese multinationals' acquisitions faced a double blow: abroad and at home.

During the peak years of Chinese outbound M&A, acquirers had targeted strategically important sectors such as Energy, Industrials Materials and Information Technology. These sectors represented about half of the acquisition value from 2014-2016. Host countries increasingly feared that their native technology sectors would fall under foreign control, which led to a growing distrust towards Chinese M&As. The US-China trade and technology war that broke out in 2018 after the election of President Trump, paved the way for the increased scrutiny of advanced economies towards China's overseas investments. Many advanced economies put in place new mechanisms to screen foreign direct investment and strengthened existing ones, and a number of overseas acquisitions by Chinese firms were either abandoned or blocked. In the United States, the Committee on Foreign Investment (CFIUS) was reinforced, and its scrutiny significantly increased.

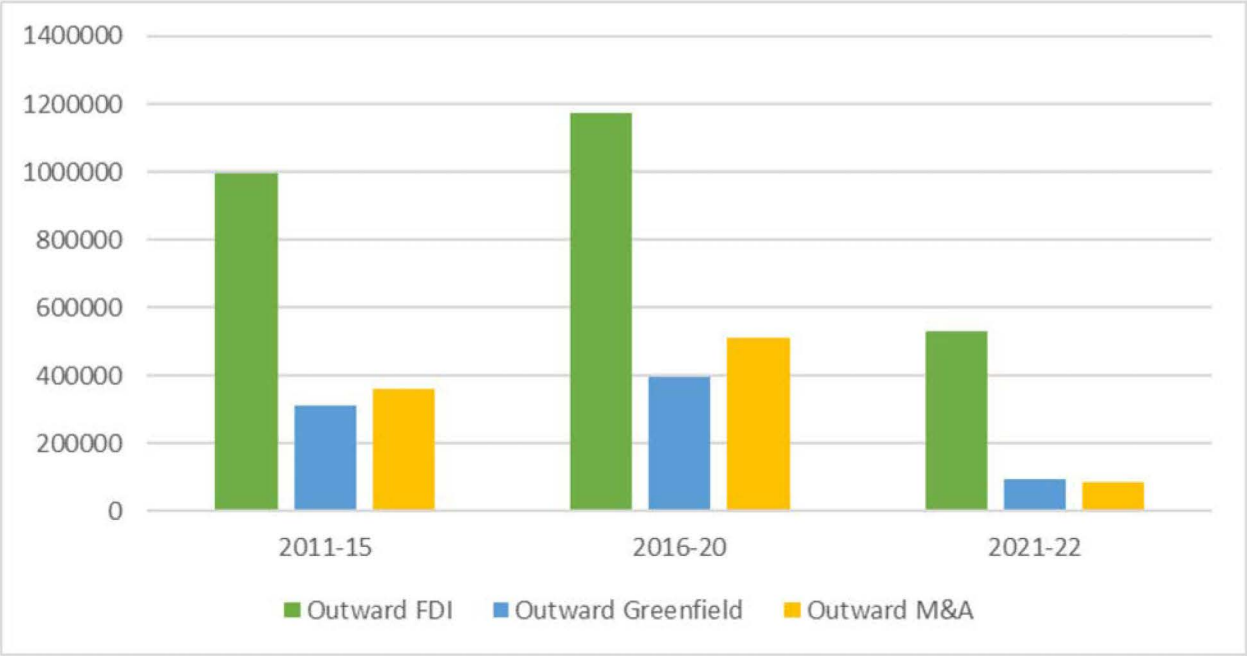
Within China, the dramatic surge of outbound M&As in 2015-2017 also prompted the Chinese government to react. Real Estate was particularly targeted by Chinese cross-border M&As, and the Chinese government feared that such transactions were motivated by speculative reasons or money laundering. They were particularly concerned by the potential financial instability created by the massive capital outflows entailed by the transactions. In the fall of 2016, they announced stricter approval requirements for M&A deals and restricted real estate purchases abroad by State-Owned Enterprises (SOEs). In August 2017, they issued "guidelines on overseas investment" that classify overseas investments into three main categories: 1) encouraged investments; 2) restricted investments; and 3)

FIGURE 7. CHINA'S CROSS BORDER M&AS, TOTAL DEAL VALUE, 2000-2022 (USD MILLION)



Sources: EMI research team and Tianchang Wang based on Refinitiv SDC Platinum (https://www.refinitiv.com/), accessed in July 2023 .

FIGURE 8. CHINA OUTWARD FDI (OFDI FLOWS; GREENFIELD ANNOUNCED PROJECTS; ANNOUNCED M&AS)



Note China + Hong Kong + Macao do not include investments among these three territories. Except for OFDI OFDI flows refer to FDI outflows on a Balance of payments basis; outward greenfield and outward M&As refer to announced greenfield projects and announced M&As.

Sources: EMI research team and Tianchang Wang based on data from UNCTAD; Financial Times fDi Markets (https://www.fdimarkets.com/). and Refinitiv SDC Platinum (https://www.refinitiv.com/), accessed in July 2023 .

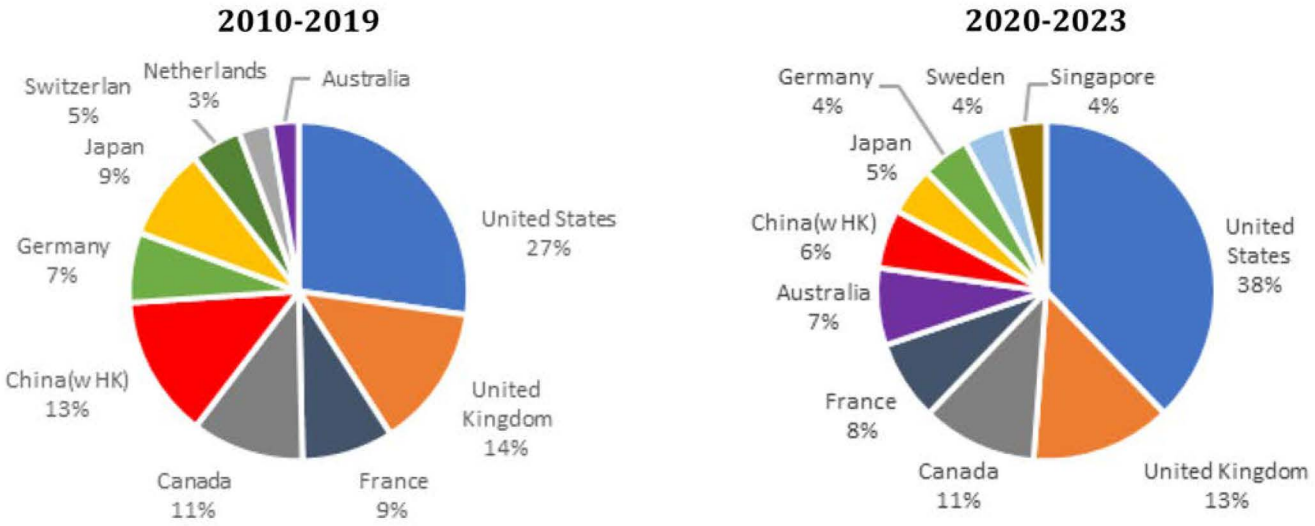
prohibited investments and in December 2017 they released a code of conduct for private companies investing abroad. These policy shifts not only tempered the acquisition fervor of Chinese investors, but also affected the confidence of their financiers, making financing for M&A purposes harder to obtain.

These headwinds significantly impacted Chinese cross border M&As: their value fell substantially after 2017 (see Figure 7) and they have not yet recovered: in 2022 they barely reached the level of the mid 2000s, before the Global Financial Crisis. While during the past decade China accounted for about 12% of the total value of crossborder M&A by the 10 largest global investors, such share was halved over 2020-2022 (Figure 9). China nevertheless remains one of the 10 biggest international acquirers in the world.

Since 2017, the geographical focus of Chinese outbound M&As has shifted from United States and Europe to Asia (Figure 10). The latter region, which accounted for about 20% of the value of cross border M&As over 2009- 2016, saw its share rise to about 50% on average since 2017.

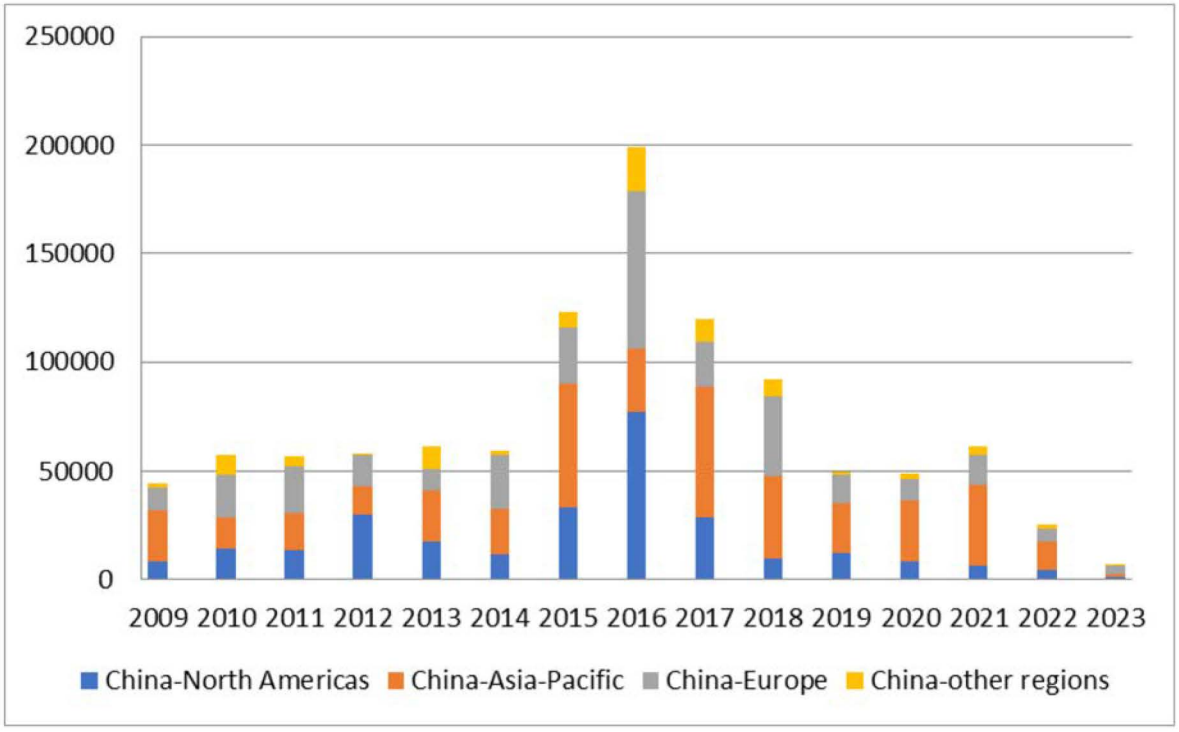
Just as cross border announced M&As, announced Greenfield FDI projects by Chinese firms have risen significantly since 2000, reaching USD 894 billion over 2010-2023. With about 9% of the world total, China was the second greenfield investor after the United States over that period. And just as cross-border M&As, China's greenfield FDI also declined since the late 2010s, in line with the trend prevailing globally, partly as result of the

FIGURE 9. SHARE OF TOTAL OUTBOUND M&A DEAL VALUE, BY COUNTRY 2010-2019 AND 2020-Q12023*



Sources: EMI research team and Tianchang Wang based on Refinitiv SDC Platinum (https://www.refinitiv.com/), accessed in July 2023.

FIGURE 10. CHINA'S CROSS BORDER M&AS, BY DESTINATION, 2009-Q1 20223 (USD MILLION)



Sources: EMI research team and Tianchang Wang based on Refinitiv SDC Platinum (https://www.refinitiv.com/), accessed in July 2023.

COVID crisis. China remained in second position as a greenfield investor in 2020 and 2021 after the United States but dropped to the sixth rank in 2022 (Table 3).

China's greenfield projects have principally targeted emerging economies: the latter accounted for about two thirds of China's greenfield FDI over 2010-Q12023, with about one third accounted for by Asia alone and 15% by Africa.

An examination of both cross-border M&As and Greenfield projects suggests a progressive shift in the sectorial distribution of Chinese firms' outward FDI. At the beginning of their global expansion heavy industries such as coal, oil, and gas as well as metals were the most targeted sectors by Chinese greenfield FDI, accounting for almost 50% of the Chinese greenfield FDI portfolio in 2003-2008 for instance. Such a share declined to 23% for the following 10-year period (2009-2018). Business services, real estate, and renewable energy benefited from this sectorial redirection: their share almost

Table 3. Total value of announced FDI greenfield projects per country of origin - top 20 countries, 2010 to 2023, and 2018-1Q 2023 (million USD) (Red E20+1, blue, G7)

	Country	Total Invested (2010-2023)	2018	2019	2020	2021	2022	Q1 2023
1	United States	1,860,012	186,459	147,492	112,454	182,371	212,518	43,906
2	China (+Hong Kong)	893,671	110,958	73,562	66,648	68,132	68,747	63,643
3	Germany	767,559	81,591	71,935	39,475	67,651	61,023	31,435
4	Japan	626,168	62,673	48,042	30,545	28,052	42,612	4,798
5	United Kingdom	623,528	45,516	48,612	35,964	37,027	90,910	26,756
6	France	519,369	51,127	42,015	36,663	30,768	74,698	12,599
7	South Korea	400,291	31,035	31,161	8,727	32,925	75,712	9,222
8	UAE	328,217	27,696	14,619	7,692	14,879	80,567	47,059
9	Spain	285,396	21,909	25,766	20,837	21,784	23,490	5,224
10	Canada	269,871	19,054	20,976	16,778	19,285	29,450	7,067
11	Singapore	269,010	30,091	37,605	18,112	18,389	18,944	3,436
12	Netherlands	260,097	45,899	24,059	17,373	20,591	23,445	10,713
13	Taiwan	250,782	34,544	6,581	28,117	14,994	48,784	11,602
14	Italy	242,515	27,102	11,508	10,638	19,122	31,519	2,031
15	Switzerland	224,078	18,834	24,887	15,398	12,121	19,805	5,538
16	India	205,875	9,890	10,119	3,656	11,099	38,869	3,099
17	Australia	158,306	13,279	10,974	4,032	15,774	31,765	3,529
18	Denmark	137,722	8,584	8,187	7,933	11,672	25,808	11,347
19	Russia	132,138	11,056	7,159	1,806	2,618	1,366	1,486
20	Sweden	109,006	6,768	9,923	11,035	8,949	14,608	4,590

Note: Red for E20+1, Blue for G7.

Sources: EMI research team and Tianchang Wang based on Refinitiv SDC Platinum (https://www.refinitiv.com/), accessed in July 2023 .

tripled to 27% over 2009-2018, compared to the pre-crisis period (Casanova and Miroux 2020b). Similarly, the industry distribution of Chinese outbound M&As changed over the past decade, with a decline of the share of industries such as energy and materials and a diversification into multiple sectors including consumer products, real estate, communications services, information technology, and utilities, in a pattern more akin to that of a mature economy such as the United States (Casanova and Miroux 2020b). An examination of both cross-border M&As and Greenfield projects suggests a progressive shift in the sectorial distribution of Chinese firms' outward FDI. At the beginning of their global expansion heavy industries such as coal, oil, and gas as well as metals were the most targeted sectors by Chinese greenfield FDI, accounting for almost 50% of the Chinese greenfield FDI portfolio in 2003-2008 for instance. Such a share declined to 23% for the following 10-year period (2009-2018). Business services, real estate, and renewable energy benefited from this sectorial redirection: their share almost tripled to 27% over 2009-2018, compared to the pre-crisis period (Casanova and Miroux 2020b). Similarly, the industry distribution of Chinese outbound M&As changed over the past decade, with a decline of the share of industries such as energy and materials and a diversification into multiple sectors including consumer products, real estate, communications services, information technology, and utilities, in a pattern more akin to that of a mature economy such as the United States (Casanova and Miroux 2020b).

Assessing the international presence of the largest Chinese multinationals

There are various ways to assess the international presence of firms. One is to look at the intensity of their presence through their assets, employment, and sales abroad as a ratio of their total assets, employment and sales respectively—as does the Transnationality Index published by the United Nations Conference on Trade and Development (UNCTAD).[2] Another one is to consider the geographical spread of their international presence: in how many countries does the company operate through branches, subsidiaries or affiliates? This may be of particular interest in today's world where, due to digitalization, new modes of organizations within the firm and the remarkable expansion of Global Value Chains, operating abroad does not necessarily require sizable foreign assets (Ietto-Gillies 2021, Trentini 2021).

In an exercise undertaken in 2022, we could observe how geographically spread the international presence of large Chinese firms is. We examined the top 330 Chinese billionaire firms that were among the 500 largest emerging market companies by revenues (the so-called top 500 EMNCs of the EMI reports). The ten most internationalized[3] of these firms are present in 55 countries on average, the following 10 in 44 countries, and in 37 and 29 countries for the following 10 firms groups respectively (Casanova and Miroux 2022) Geographical proximity remains a key factor: seven of the top 20 destinations (based on the number of firms that have a subsidiary or affiliate in the host country) are in Asia-Pacific—Australia, India, Indonesia, Japan, Malaysia, Singapore, and Thailand (Table 4)—but these firms have also a very significant

[2] The Transnationality Index (TNI) is a composite index calculated as the arithmetic average of three ratios: foreign assets to total assets, foreign sales to total sales and foreign employment to total employment (UNCTAD, 2007).

[3] Measured by the number of countries in which a firm has subsidiaries or affiliates in 2022. Based on data from Orbis database.

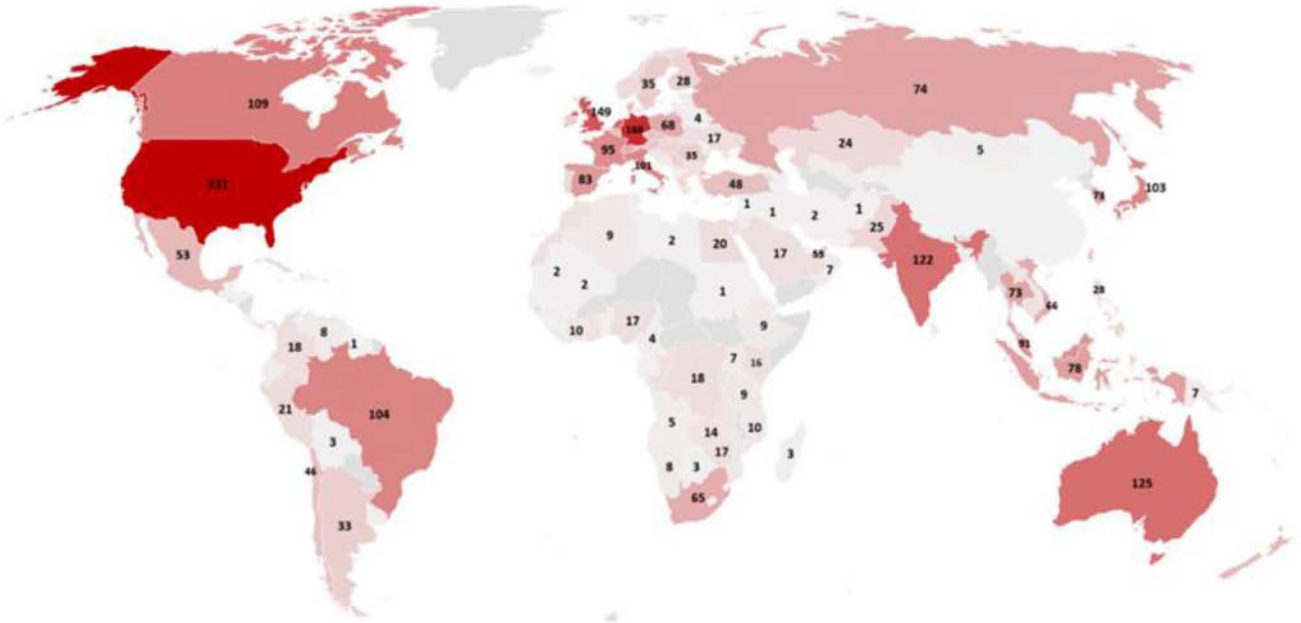
presence in the United States: 231 Chinese firms—the largest number, and two thirds of the 330 top firms examined—have subsidiaries or affiliates in the US. They also are very much present in the European Union (Figure 12), most specifically in Germany, United Kingdom, the Netherlands, Italy and France with 60%, 45%, 40%, 30 and 28% of the top 330 Chinese firms respectively. Brazil and Mexico also see a significant presence of Chinese firms. Finally, in Africa, Chinese firms are present in virtually all countries, in particular in South Africa, Congo DR, Egypt, Nigeria and Zimbabwe. If we compare with the top 330 largest US firms, the latter are present on average in a larger number of countries than their Chinese peers. For

TABLE 4. TOP 20 POPULAR DESTINATIONS FOR THE 330 BIGGEST MULTINATIONALS BY REVENUES: CHINA VERSUS THE U.S. (2021)

From China						From United States					
1	United States	231	**11**	Japan	103	**1**	Canada	297	**11**	France	203
2	Singapore	224	**12**	Italy	101	**2**	United Kingdom	276	**12**	Spain	197
3	Germany	188	**13**	France	95	**3**	China	235	**13**	Ireland	197
4	Cayman Islands	170	**14**	Malaysia	91	**4**	Netherlands	231	**14**	Italy	195
5	United Kingdom	149	**15**	Luxembourg	86	**5**	Germany	227	**15**	Switzerland	189
6	Netherlands	130	**16**	Spain	83	**6**	Singapore	217	**16**	Japan	187
7	Australia	125	**17**	Indonesia	78	**7**	India	213	**17**	Belgium	170
8	India	122	**18**	Bermuda	77	**8**	Mexico	212	**18**	Luxembourg	169
9	Canada	109	**19**	Russian Federation	74	**9**	Australia	209	**19**	Poland	169
10	Brazil	104	**20**	Thailand	73	**10**	Brazil	206	**20**	Malaysia	161

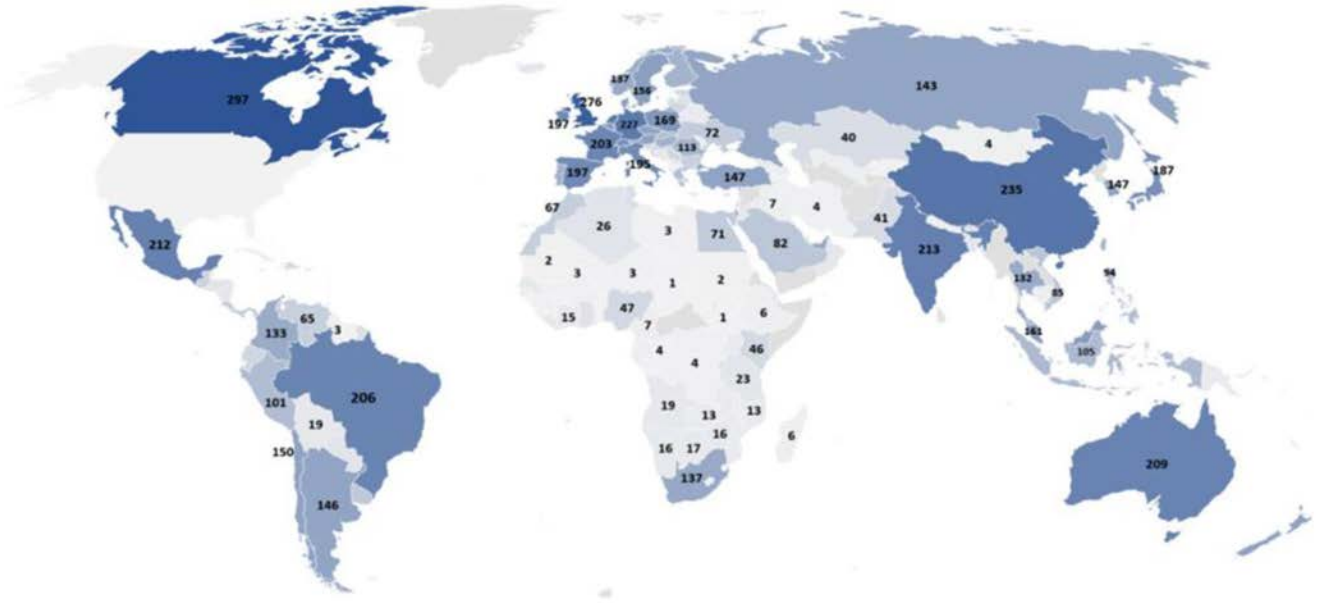
Sources: EMI research team based on Orbis (https://orbis.bvdinfo.com/), accessed October 2022.

FIGURE 11. NUMBER OF COUNTRIES IN WHICH THE 330 BIGGEST CHINESE COMPANIES (BY REVENUES) ARE PRESENT, 2022



Sources: EMI research team based on Orbis (https://orbis.bvdinfo.com/), accessed between September - October 2022.

FIGURE 12. NUMBER OF COUNTRIES IN WHICH THE 330 BIGGEST U.S. COMPANIES (BY REVENUES) ARE PRESENT, 2022



Sources: EMI research team based on Orbis (https://orbis.bvdinfo.com/), accessed between September - October 2022 .

instance, the ten most internationalized firms were present in 88 countries, and the following 10 in 80 countries (Casanova and Miroux 2022). Yet, the gap between the largest Chinese firms and the United States is not as wide as one could have expected, especially given the relatively recent global expansion of the latter. Chinese firms' international expansion has not only been remarkable in terms of volume; it is also noticeable for its global reach.

Adding innovation to their portfolio of competitive advantages

Low prices have always been and continue to be a key competitive advantage of Chinese firms, even if labor costs in China have increased. In industries such as solar panels or electrical vehicles the price differential is high, making Chinese production a major threat for these industries in several advanced economies. Added to that is the emergence of China as a significant global innovator, as illustrated by its rise in technology and innovation indexes such as the Global Innovation Index (GII). In 2023, the GII ranked China as the 12th most innovative economy out of 132 countries—a significant progress compared to its rank (34th) ten years before—and ahead of a large group of developed economies, including Japan, Canada, Australia, and Italy. China has become a leader in a variety of domains, including critical technologies such as energy, space, artificial intelligence, robotics, quantum computing, biotech, and green transition. It is home to global tech leaders such as the provider of telecom equipment Huawei, the technology conglomerate Tencent or the ecommerce Alibaba, just to name a few.

China's lead in technology and innovation results from the steadfast policy for technological development and innovation pursued since 1980. Such a policy went through four main phases (Cahen, Casanova and Miroux

2021, Casanova, Miroux and Ye, forthcoming):

- **The Experimental Phase (1978-1985)**: when China, departing from the original Soviet-type model for innovation, facilitated the privatization of state-owned enterprises and pushed toward greater enterprise autonomy—which encouraged more innovation activities.
- **The Systemic Reform Phase (1985-1995)**: that saws the adoption of the Science and Technology System Reform Act in 1985, aimed at building strong ties between industries and research institutes and narrowing the gap between science findings and business applications.
- **The Deepening Reform phase (1996-2006)**: during which the Chinese government established a national strategy for "rejuvenating the nation's economy with science and education" through its 9th Five-Year National Budget Plan and the Outline of the 2010 National Target, and
- **The Long-Term Plan and Policy Optimization phase (2006-now)**: when China, as part of its innovation-led growth strategy, set its goal to become a "top innovative nation" by 2020. The above mentioned "Made in China 2025" strategy launched in 2015 to reduce China's dependence on foreign technology and become self-sufficient has been an important milestone of China STI policy. "Indigenous innovation" has been one of its core element. In recent years, China's leadership has increasingly embraced the concept of the "innovation chain" to emphasize the need to cover all the steps along the value chain - from basic research to commercialization.

Such a context has been highly favorable to Chinese firms strengthening their technology and innovation capabilities. An illustration of this trend is the increase in the R&D expenditures of Chinese firms: data from Eurostat reveal that, with almost 690 firms in 2022, the share of Chinese firms in the 2,500 biggest R&D corporate spenders in the world tripled between 2014 and 2022, from 8% to 28%, getting close to that of the United States (33%) (Figure 13). In this process, Chinese firms moved up the ranks: their numbers in the top 1,500 corporate spenders more than quadrupled from 37 to 173 over the same period. The rise of these corporate spenders may also help to reduce China's reliance on FDI with domestic companies able to fund their own innovations.

Among the top spenders one finds the Chinese Huawei, ranked fifth in the list. Huawei spent USD 21 billion on R&D in 2022—or about 23% of its revenues (European Commission 2015 and 2023). With 2,770 patents received in the United States, Huawei was among the top five companies getting the most U.S. patents in 2022 (Schmidt and Vance 2020). In spite of the American sanctions, Huawei still is a dominant 5G-network supplier. As part of its drive for technological self-reliance Huawei has invested heavily in domestic semiconductors firms, largely through a fund, the Hubble Technology Investment Co. created by Huawei in 2019. It has also been branching out toward sectors such as intelligent automotive solutions, cloud computing and Artificial Intelligence. In 2023, Huawei launched its Mate 60 phone powered by Chinese-made chips, a result of its substantial R&D efforts in semi-conductors. That same year, it also saw its profits more than double to 12 USD billion (Lin and Huang 2024).

One also finds among the very top Chinese corporate R&D spenders firms like Tencent ranked number 19 among the EU 2,500 top corporate spenders, e-commerce Alibaba,

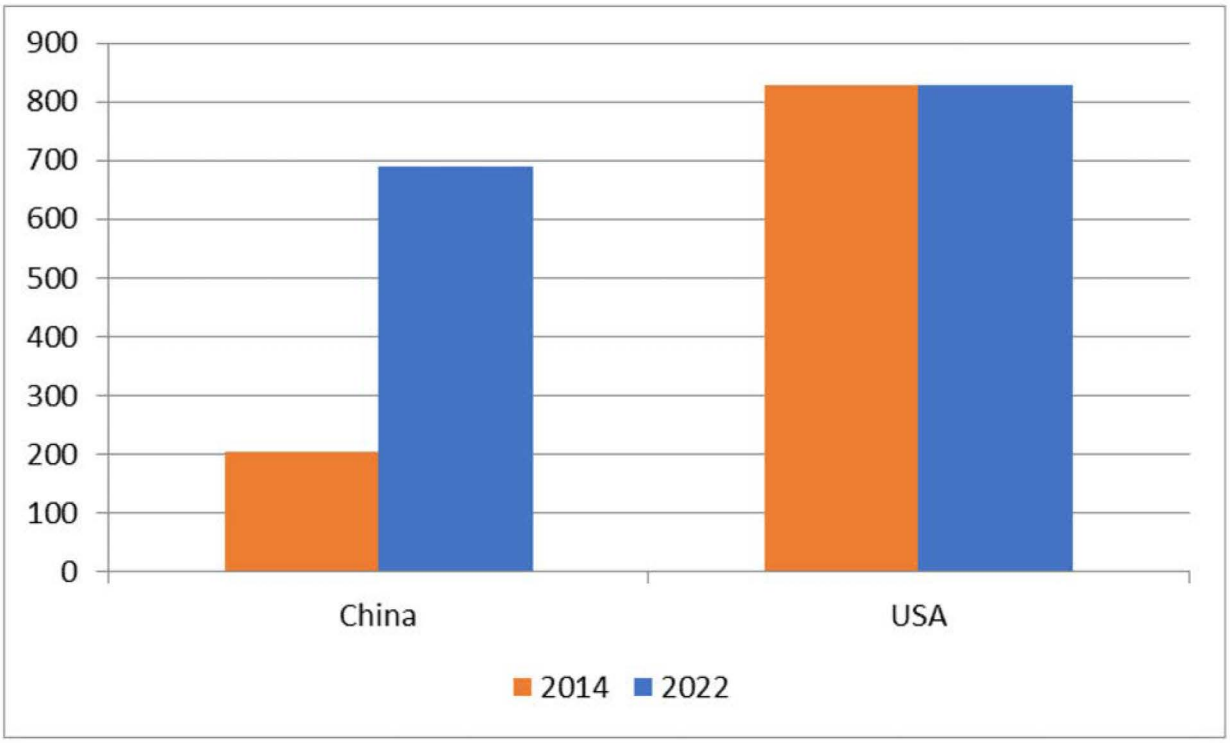
(number 22), construction and railway like China State Construction Engineering and China Railway (number 30 and 51 respectively), software and computing services like Baidu (number 62), telecom like ZTE, (number 73) and China Mobile, (number 78), and automobile like SAIC (number 70) and the leader of electric vehicles worldwide BYD (number 82) for instance.

Since the turn of the century, Chinese firms have hence gradually evolved from copycats to innovators, shifting towards value-added activities and deploying their innovation capabilities across a variety of sectors. Today, a significant number of Chinese multinationals have become household names all over the world, taking a leading position and disrupting the global competitive landscape traditionally dominated by western enterprises. Besides Huawei in telecom equipment, this has been the case for example in ecommerce with Alibaba and Aliexpress; in entertainment with Bytedance (parent company of TikTok); in automobile with BYD and Geely; in white goods with Haier; and in the fashion retail industry with firms such as Shein, just to name a few of China's disruptors.

A few sectors and industries such as Artificial Intelligence, mobile payments and electric vehicles exemplify how China's multinationals are building upon their technology and innovation capabilities to compete globally.

• *Artificial intelligence* (AI) is a cornerstone of innovation within China's business landscape, and many Chinese companies are successfully developing market competitive products and services around AI applications. Beyond AI software companies, such as Sensetime—a company that provides AI-empowered solutions and platforms, content generation,

FIGURE 13. NUMBER OF FIRMS FROM CHINA AND THE UNITED STATES INCLUDED IN THE TOP 2500 GLOBAL R&D CORPORATE SPENDERS, 2015 AND 2022



Sources: Authors, based on data from Eurostat, The 2015 and 2023 EU Industrial R&D investment Scoreboards (European Commission 2015 and European Commission 2023) accessed by March 2024.

TABLE 5. CHINESE TOP RESEARCH AND DEVELOPMENT CORPORATE SPENDERS, 2022

Global ranking	Company	
5	HUAWEI INVESTMENT & HOLDING	Technology Hardware & Equipment
19	TENCENT	Software & Computer Services
22	ALIBABA GROUP HOLDING	Software & Computer Services
30	CHINA STATE CONSTRUCTION ENGINEERING	Construction & Materials
51	CHINA RAILWAY	Construction & Materials
58	CHINA RAILWAY CONSTRUCTION	Construction & Materials
62	BAIDU	Software & Computer Services
63	CHINA COMMUNICATIONS CONSTRUCTION	Construction & Materials
70	SAIC MOTOR	Automobiles & Parts
71	POWER CONSTRUCTION CORPORATION OF CHINA	Construction & Materials
73	ZTE	Technology Hardware & Equipment
74	MEITUAN	General Retailers
78	CHINA MOBILE	Mobile Telecommunications
82	BYD	Automobiles & Parts
87	METALLURGICAL CORPORATION OF CHINA	General Industrials
88	PETROCHINA	Oil & Gas Producers
98	BAOSHAN IRON & STEEL	Industrial Metals & Mining
110	NETEASE	Software & Computer Services
114	CONTEMPORARY AMPEREX TECHNOLOGY	Electronic & Electrical Equipment
117	XIAOMI	Technology Hardware & Equipment

Sources: Authors, based on data from Eurostat, The 2015 and 2023 EU Industrial R&D investment Scoreboards (European Commission 2015 and European Commission 2023) accessed by March 2024.

facial recognition, object detection, image analysis among others to enterprises in a variety of sectors—China tech companies have embraced AI, leveraging its capabilities to drive efficiency and develop new products and services (Casanova and Miroux, 2020b). In the drone industry, for instance, AI plays a crucial role in enhancing the capabilities of the Chinese DJI, the current global leader (Appendix 2).

• *Digital payments*: China is a global leader in the digital payment industry. The widespread adoption of mobile payment solutions is due to the success of homegrown payment platforms like Alipay and WeChat Pay, operated by tech giants Alibaba and Tencent. In terms of transaction volume and value, China consistently ranks at the top globally. It is hence no surprise that China has been at the forefront of the Central Bank Digital Currency (CBDC) experiment, having reached the pilot phase for the implementation of its CBDC, the e-yuan.

• *Electric vehicles*: The rise of China's electric vehicle (EV) industry has been remarkable, propelled by a combination of government support, technological innovation, and shifting consumer preferences. The conversion of the automobile industry to electric vehicles helped Chinese automobile companies to leave behind the tarnished image they had in the combustion engine sector. Chinese firms have hence emerged as the frontrunners of the EV market globally, expanding their presence internationally through strategic partnerships, investments, and sales efforts. BYD and Geely exemplify this transformation (Appendixes 3 and 4).

Looking ahead: Will the growth and expansion continue?

Chinese firms have grown over the past 25 years, drastically transforming the global competitive landscape. Many of them feature prominently in top business rankings and their investments are spread widely across the world. Chinese firms often adopt a long-term strategic approach, focusing on sustained growth and market dominance over immediate profits—a perspective deeply rooted in cultural and historical contexts.

A key factor behind the fast expansion of Chinese firms has been the substantial growth of the Chinese economy since the turn of the century, leading to the emergence of a sizeable and growing domestic consumer base which Chinese firms could build upon. A second factor has been the strong support of the government and last but not least intense competition from foreign and domestic firms also played a key role. Having enhanced their R&D efforts, Chinese firms have climbed the technology and innovation ladder, and several of them have become global innovation leaders.

While Chinese companies have been part and parcel of the transformation of China into a global powerhouse, their fast global expansion also benefited from a propitious global environment. Since the late 2010s, however, such an environment has changed drastically. The global trade system is being upended by many factors including trade wars between China and the United States (and the European Union) and a series of protectionist measures on trade and investment across the globe. At the same time, geopolitical tensions have been mounting and military conflicts have broken out including in Europe. It remains to be seen how China will navigate this new, complex, and uncertain environment and how this will affect the global expansion of its enterprises.

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Appendix 1. State Grid Corporation of China (SGCC), the electricity giant

Following its reform of the electricity sector in the late 1990s, the Chinese government created in 2002 two companies to handle transmission and distribution, the State Grid Corporation of China (SGCC) –the largest one – and the China Southern Power Grid Company. Twenty-five years later, SGCC has become a global powerhouse, the world's largest energy and utilities company clearly above the other contenders (such as the German Uniper, the French Engie, and the Italian Enel, for instance) and the third largest company in terms of revenues globally in the 2023 Fortune Global 500 list. SGCC provides about 80% of China's electricity supply (Enerdata 2024). Despite its dramatic rise, however, SGCC is still relatively unknown outside China.

The growth of the Chinese market, the state-owned structure of the company, and its emphasis on technology are the main reasons for SGCC's success. SGCC expenditures on R&D reached USD 1bn a year over 2014-2017 and exceeded 2 USD billion per year in 2019-2020—more than twice the average of the early 2010s. The company concentrated its research on transmission technologies that would enable China to address the mismatch between its resources and demand for electricity – a huge challenge for a country with as vast a territory as China's. SGCC opted for Ultra High Voltage (UHV), a technology that enables the transmission of electricity over long distances with reduced power loss. UHV opens the possibility to develop major power projects in remote areas and transmit their electricity to far away cities.

When SGCC launched its research program, a few firms such as Siemens and ABB had developed some UHV cable technology, but none was in commercial use or production. SGCC pioneered the large-scale deployment of this technology. By 2017, it developed the world's first ± 1100 KV UHV DC (direct current) wall.

State Grid in 2023
Revenues: USD 530 billion
Net profits: USD 8.2 billion
Employees: 870,827
Rank in Fortune Global 500: No 3

Internationalization has been a key element of SGCC's growth strategy. Mergers and acquisitions (M&As) have played a key role in the process, with SGCC spending at least USD 27 billion in overseas acquisitions of electricity companies between 2007 and 2020. As a result, the company developed a significant global presence with operations in Africa; Asia (in particular in Australia where owing to its ownership stakes in transmission networks and electricity services firms it covers vast part of the territory); in Europe (in Greece, Italy and Portugal in particular where it holds significant stakes in major players in gas and electricity infrastructure) and in the Middle East (e.g. Oman). In Latin America, its presence is most notable in Brazil where, through acquitions in transmission companies and power lines, SGCC has become the largest power generation and distribution company; and in Chile where it acquired among others 45% of the largest electricity distribution company. In addition to these directs stakes in utility companies, SGCC also runs projects in more than 20 countries including in in Africa (Equatorial Guinea, Kenya, Nigeria, Sudan, and Zambia), Asia (Cambodia, India, Indonesia, Myanmar, Pakistan, Thailand, and Vietnam), Caucasus (Georgia), Latin America (Venezuela), and the Middle East (Iran and Saudi Arabia).

Clean energy and the Global Energy Interconnection (GEI)

Being a state-owned firm, SGCC's R&D efforts have taken place within the broader context of China's policy to address climate change and

combat air pollution. In addition to UHV, SGCC has worked on the deployment of smart grids that can facilitate the integration of variable renewable energy sources (like wind and solar) in the power network. It has also invested in energy storage initiatives to address the intermittency of renewable energy sources.

Furthermore, SGCC has been a leading advocate of the Global Energy Interconnection (GEI), an initiative that seeks to create a global grid network to transmit clean energy across continents. Initiated by SGCC at the United Nations Climate Summit in 2014, the proposal was officially launched at the United Nations Sustainable Development Summit in 2015 by Chinese president Xi Jinping. Conceived as an integrated system built around renewable energy, smart grids, and UHV, the global network would serve as the backbone of a transition away from fossil fuels and help to address climate change. Using UHV, it would connect remote renewable sources of energy to global consumption centers through smart grids and power transmission lines spanning continents, matching supply and demand across countries and continents more efficiently. In 2016, SGCC established the Global Energy Interconnection Development and Cooperation Organization (GEIDCO) in collaboration with the United Nations "Sustainable Energy for All" program. GEIDCO's responsibilities include developing technical standards, arranging and coordinating the many players involved, and offering advisory services for the development of the GEI. As of March 2024, the GEIDCO chairman is Xin Baoan, Executive Chairman of SGCC.

Several areas offer promising opportunities for SGCC's future development. SGCC for instance has worked on the creation of an energy-services company to promote the distribution of clean energy to rural regions. It is also diversifying its activities. It is developing software to control the voltage and frequency at destination points throughout the network. It also supports charging services for all electric vehicles (EVs), allowing consumers to install their own charging stations.

However, the company faces numerous challenges. For example, UHV-based infrastructure still experiences some energy loss, albeit minimal, which can hamper ambitions for an intercontinental grid connection. The transition from fossil fuel to renewable energy is also a major challenge. Furthermore, because they involved critical infrastructures, such as energy grids and telecommunications networks, State Grid's acquisitions have sparked national security and economic dependency concerns, raising apprehensions about the potential for Chinese government's influence and control. There are also legal, political, and even geopolitical obstacles. For example, one barrier to a worldwide grid network is the disparities in legal systems governing interconnected energy transmission networks. Another concern relates to cybersecurity risks as interconnected grids create numerous points of vulnerability. Critics also worry that countries heavily reliant on these interconnected grids could become vulnerable to the strategic interests and policies of the dominant players, particularly if those players are state-owned entities like State Grid (Quimbre et al. 2023, 108-112).

Overall, in the less open global environment that is currently emerging, the internationalization pace of SGCC may slow down. Yet, State Grid will remain a dominant player in the electricity sector in the world, because of the size of its domestic market, the support of the Chinese government, and the unmet demand for electricity in emerging and developing economies.

Appendix 2. DJI, a born global

Da Jiang Innovation Sciences and Technologies Ltd (DJI), founded in 2006 as a private company, has become the leader in the consumer and professional drone market. DJI emerged as a global player from its inception, strategically expanding abroad despite encountering market uncertainties at home. It ventured into Western markets in 2009, just as it was starting to sell its drone control system in China. The company swiftly rose to prominence with its flagship offering, the Phantom, a sophisticated yet competitively priced product. The Phantom series became a top choice for film studios worldwide, as well as both professional and amateur photographers. By 2021, DJI had secured a commanding 76% share of the global market (Statista 2022). In the USA, it established DJI North America in 2011, headquartered in Los Angeles. A decade later, DJI accounted for nearly 80% of the consumer drone market in the country (Schmidt and Vance 2020).

DJI manufactures its drones primarily in China, mostly in Shenzhen, leveraging the city's robust technology manufacturing ecosystem including its excellent physical infrastructure, streamlined logistics services, and vast pool of highly skilled workers. Currently, DJI' presence overseas is through sales offices, distribution networks, and repair and after-care service facilities established in key markets such as Japan, the USA, South Korea, Germany, among others. The company had R&D offices in the US; they closed in 2021 partly because of the growing scrutiny the firm has been subjected to (see below).

Over the years, DJI has placed a strong emphasis on both basic and applied research. A considerable portion of DJI's workforce, approximately a quarter of its 14,000 employees, was dedicated to research and development in the early 2020s. By 2022, the company had amassed the largest number of drone-related patents globally, totaling around 8,000 (Global Data n.d.). Within its consumer segment, DJI has notably focused on camera drone technology. In a significant move in 2017, the company acquired a majority stake in the Swedish camera company, Victor Hasselblad AB, renowned for being the camera used to shoot photos during the Apollo 11 moon mission (Haggin 2017). In 2022, DJI made another strategic move by venturing into the intelligent driving systems sector with the launch of DJI Automotive.

DJI has faced allegations of close links with the Chinese government. It reportedly received investment from Chinese state-owned entities such as the China's State Development & Investment Corporation (SDIC) and the Shanghai Venture Capital Fund owned by the Shanghai Municipality (Cadell 2022). In 2021 DJI was blacklisted by the US commerce Department and as of early 2024, the US Congress was weighing legislation banning any new models of DJI drones, following allegations that DJI drones could provide access to sensitive information (on individuals and infrastructure for instance). DJI has consistently denied these allegations, but the unfolding situation raises uncertainties about the company's future prospects for global expansion.

Appendix 3. The transformation of BYD

Established in 1995, BYD has undergone a remarkable transformation from its origins as a manufacturer of rechargeable batteries to a global leader in electric vehicles (EVs). The company made its entry into the automotive industry in 2003 with the BYDF3, an affordable and fuel-efficient car that swiftly gained popularity in China. By 2008, BYD embraced electric mobility, pioneering the first Chinese mass-produced hybrid vehicle, and by 2022 it announced that it had completely stopped the production of cars powered only by gasoline (BYD 2022). Beyond cars, the company has also been working on diversifying its portfolio and ventured into electric buses, trucks, and mono-rails.

BYD has made remarkable strides in the global automotive market. By the first half of 2023, with vehicle sales totaling 1.25 million, it reached the 10th position among the world's largest automobile manufacturers, just behind Suzuki and ahead of brands like BMW and Mercedes. It did not even rank in the top 20 in 2021.

In 2022, with almost 2 million EV sold, BYD became the top EV seller of electric vehicles worldwide, surpassing Tesla (Lu 2023). Its soaring revenues have propelled BYD up in the 2023 Fortune's Global 500 ranking where it shot up 224 ranks compared to the year before, reaching the 212Th position with 63 U.S billion in revenues (Fortune Global 500 2023). It had just entered the Fortune Global 500 in 2022. The rapid and significant shift China has made over the past four years toward clean energy cars, along with continuous advancements in product design and technical quality, contributed to such an evolution.

BYD's focus on vertical integration sets it apart from other automobile manufacturers. The firm has built a comprehensive supply chain encompassing lithium mining and processing, battery production, and an in-house computer chip unit. It is also developing a shipping operation to ensure efficient transportation of its car production to export markets.

Its strong capabilities in batteries, built upon its 20 years' experience in the industry, is another key distinguishing factor. BYD is one of the few global automakers, in addition to Tesla and EV start-up Lucid Motors, that fully manufacture their electric motors in-house. Besides developing and producing its own batteries, the company also supplies batteries to other producers through its subsidiary FinDreams. In 2020, it introduced the Blade battery whose new lithium-iron phosphate technology (LFP) reportedly enhances energy density and safety. In 2024, the US giant automotive supplier BorgWarner announced a strategic partnership with FinDreams Battery, whereby Borgwarner would manufacture FinDreams' blade battery.

International expansion is also on the agenda of BYD. The company, however, has been facing challenges in its overseas expansion, due to a global slowdown in EV sales - partly due to a phasing out of subsidies in Europe - as well as issues specific to the company (Cheng, Davis and Huang 2024). BYD has an electric bus and truck factory in the US but no car production facility. It is planning a major push into Europe, where it expects to build factories (in Hungary in particular) to avoid EU tariffs on Chinese car imports. It is also targeting emerging markets, opening a factory in Thailand (its first car production facility outside China, to be operational in 2024) and constructing one in Brazil. It is also planning a production plant in Uzbekistan.

Appendix 4. Geely's global expansion

Geely Automobiles was created in 1997, when Zhejiang Geely Holding Group (ZHG or Geely), a refrigerator manufacturer, entered the automobile industry. A privately held company owned by its founder, Li Shufu and his son, its operations span the automotive value chain, from research and development to design, production, sales and services. Ranked Number 225 in Fortune Global 500 in 2023, Geely was the third largest automobile manufacturer in China by revenues behind SAIC Motor (state-owned) and BYD. The Group operates two core subsidiaries - Geely Automobile Holdings Ltd and Volvo Car AB acquired from Ford in 2010. In 2021, in addition to its 9.000 employees in China, 2,000 were based in the United States, and about 30,000 in Europe mainly in Sweden and Belgium. Geely's top retail markets are, besides China, the United States, the United Kingdom, Sweden and Germany.

In the 2010s, the company's global expansion truly took off. Geely made quick progress, focusing on the European market as a springboard for expanding globally through partnerships with, or acquisitions of, brands perceived as typically European, as seen below.

• Geely is best known for its acquisition in 2010 of Volvo Cars (originally a Swedish company), one of the most respected brands in the auto industry with a solid reputation for safety and quality. The two companies maintained separate corporate structures. The acquisition has been widely seen as successful: Volvo experienced a resurgence under Geely's ownership while the transaction boosted Geely's research and manufacturing capabilities and helped it to raise its profile. It also expanded Geely's global footprint as Volvo cars main production hubs are located, in the United States, Sweden and Belgium. In November 2023 Geely sold 3,4 % of its stake in Volvo cars, but the company retains majority ownership with 78.7 % in the company (Kiderlin 2023). Geely also has two joint ventures with Volvo: Polestar, the maker of premium electric vehicles, and Lynk & Co, that produces connected vehicles and offers new types of services and ownership models, such as subscription-based services.

• In 2014, Geely bought the British firm, London Taxis International, rebranding it London Electric Vehicle Company (LEVC). While the company continues manufacturing the classic London cabs in the United Kingdom, Geely has expanded its product line-up to include electric commercial vehicles and vans.

• In 2017, Geely became the major shareholder of another strong brand, the British automaker Lotus, famous for its sports and racing cars. In 2018, through the purchase of close to 10% of equity shares, it became one of the major stakeholders of the Mercedes Benz Group. In 2019, it formed a 50-50 joint venture with the latter to revive the money-losing Smart brand by developing the next generation of Smart electric cars. It also became one of the major shareholders of the Mercedes Benz Group in 2018 by acquiring close to 10% of the Group' equity. The two companies established a 50/50 joint venture to revive the financially struggling Smart brand by developing the next generation of Smart electric cars.

• In 2022, Geely announced it had bought a 7.6% stake in the British luxury carmaker Aston Martin Lagonda. Increasing its stake to 17% in 2023, it has become the third largest shareholder of the iconic brand. Being associated with such a brand name increases Geely's attractiveness to affluent customers while providing opportunities for collaboration, including the technologies developed by Polestar and Lotus – both under Geely's umbrella.

• In 2023, Geely signed a binding agreement with Renault to launch a new powertrain technology joint-venture company to develop and produce hybrid as well as low-emissions power trains. The new company will comprise five Research and Development (R&D) centres and 17 plants around the world (Renault Group 2023).

Over the past decade, Geely has transformed from a relatively obscure Chinese company into a prominent global enterprise, owning several prestigious international brands. Through its acquisitions, partnerships and investments it has expanded to encompass various aspect of mobility, including electric vehicles, shared mobility and autonomous driving technology, ultimately aiming to become a key player in the global mobility market.