

MERICS REPORT

Investigating state support for China's medical technology companies

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List of acronyms

BME: Below-market equity

COO: Country of origin

EUCCC: European Chamber of Commerce in China

HNTE: High and new technology enterprise

HSR: High-speed rail

IVD: In vitro diagnostics

MIIT: Ministry of Industry and Information Technology

NKP: National Key R&D Program

NMED: National Innovation Center for Advanced Medical Devices

NMPA: National Medical Products Administration

NSFC: Natural Science Foundation of China

OECD: Organization for Economic Cooperation and Development

SEI: Strategic emerging industries

SOE: State-owned enterprise

SME: Small- and medium-sized enterprise

S&T: Science and technology

VBP: Volume-based procurement

EXECUTIVE SUMMARY

For over a decade, China has viewed the medical technology sector (MedTech) as a core priority in its industrial policy strategy. The sector is central to Beijing's plans to move up the value chain and embodies its ambitions to promote innovation, industrial modernization and digitalization. Its strategic value has increased further in tandem with rising living standards and the greater healthcare demands of China's aging population. Policy support is actively facilitating the rise of domestic players and poses a growing challenge for foreign MedTech firms.

Distortions in the medical technology sector flourish due to growing policy support

The government is committed to advancing local industrial capabilities in this prominent, high-tech sector, which remains dominated by foreign suppliers. Consequently, high-end medical devices featured among the Made in China 2025 key industries released in 2015. Dedicated development plans for the medical device sector have been released in every five-year period since 2012.

The implementation of such plans has led to the rise of increasingly competitive Chinese firms, while also creating distortions within China's home market and, by extension, in global markets too. Key facets of the sophisticated support system established in the MedTech sector include:

- **Policy guidance:** The government calls on officials to cultivate Chinese brands, set global standards and leverage the huge domestic MedTech market (worth EUR 135 billion in 2022) to attract foreign firms.¹
- **Financial measures:** Companies benefit from subsidies, assistance with R&D funding, tax concessions, additional equity provided through state guidance, etc.
- **Innovation focus:** Public research labs, national manufacturing innovation centers and subsidized platforms are deployed to develop advanced medical technologies.

Officially, these measures benefit the whole sector without discriminating against foreign firms active in China. But in practice, Chinese firms tend to benefit the most, due to an overall political climate focused on self-reliance and import replacement. The following measures, for example, are indicative of discrimination against foreign companies:

- **Biased procurement:** Local content requirements and the shift toward volume-based procurement (i.e., purchasing a high volume of products at lower prices) increase the hurdles for foreign manufacturers in China's market.
- **Localization of value chains:** Foreign firms are pressured to locate their production and R&D activities within China, or risk exclusion.
- **Regulatory barriers:** For instance, China's rules mandating approval in the 'country of origin' significantly delay regulatory clearance for imported products as they must first gain approval either in the country where the market authorization holder is based or in the country of manufacture.

Financial support measures give China's MedTech firms a significant boost

China is developing a new blend of state capitalism to guide financial markets toward national technological priorities. The government has increased tax incentives for R&D investment and guided financial markets to allocate capital to innovative companies. The results are apparent in the MedTech sector.

Based on the financial data of 122 Chinese MedTech firms listed on the Shanghai, Shenzhen and Beijing stock exchanges, it is possible to calculate the value of direct subsidies, tax benefits, below-market borrowing and, more roughly, below-market equity.² The results show that:

- Between 2017 and 2022, the 122 firms have seen their access to government support increase about five times, from EUR 655 million to EUR 2.8 – 3.8 billion (from CNY 5 billion to CNY 20 – 27 billion).
- Over the same period, measured state support was equivalent to about 6 percent of firm revenue, plus or minus 0.8 percentage points based on the estimate for below-market equity. Put another way, state support directed to China's MedTech companies was worth approximately 28 percent of company net profit, or 77 percent of R&D expenses.

These results indicate that China provides significantly more state support than other advanced economies. According to the OECD, between 2005 and 2019, the same forms of support amounted to approximately 4.45 percent of revenue for firms in China on average in 13 sectors, compared to just 0.69 percent of revenue for firms in OECD countries.

In addition, about 10 percent of government R&D spending, or EUR 5.6 billion (CNY 40 billion) was spent on medical technology in 2022. This figure was calculated based on the relative importance of medical technology in China's S&T Megaprojects, the National Key R&D Program and projects funded through the Natural Science Foundation of China.

These measurements do not cover all forms of state support afforded to MedTech firms in China. Some distortions within China's MedTech market are particularly difficult to track, such as the industrial policy guidance and regulatory hurdles described above. However, this data is already enough to show that China's state support distorts MedTech markets.

Chinese firms are increasing their presence in third markets

China's growing role in the international MedTech trade reflects a trend toward increased competition in third markets. In 2000, China made up less than 3 percent of global trade in MedTech products by value. By 2021, China accounted for 12.4 percent of exports and 8 percent of imports. Key insights from the trade data include:

- China increased its share of global exports in a broad range of product categories, such as medical consumables, patient aids and dental products, where it accounted for about 20 percent of global exports in 2021. It also made advances in diagnostic imaging (11 percent of global exports) and became the top exporter of medical syringes in 2021.
- China's rise in global MedTech exports seems to have impacted US exports most. China's share of global exports rose from 2.3 percent in 2000 to 12.4 percent in 2021, while the US share fell from 36.5 percent to 22.5 percent. Meanwhile, the share enjoyed by the EU

(up from 25.4 percent to 26.9 percent) and other important exporters grew slightly over this period.³

The reasons why US exports have been more impacted than EU ones may stem from more product overlap, a stronger tendency toward offshoring by US-based firms in recent years, or EU firms' greater resilience, thanks to brand reputation and standards. In any case, EU firms are likely to face greater competition as Chinese firms move into more high-end MedTech products and improve quality standards.

Indeed, China is striving to develop local firms to cover all segments of the MedTech industry and supply chain. Local firms will probably acquire more domestic market share before setting their sights on internationalization. Firms such as Mindray (a manufacturer of patient monitoring, in vitro diagnostic, and imaging equipment) and United Imaging (a producer of imaging equipment) are already global players.

China's MedTech SMEs, particularly Little Giant firms that enjoy special government backing, will pose a growing challenge for foreign firms. The lines between private and state ownership are becoming blurrier under China's current economic model, which tries to blend market forces with state intervention. Little Giant companies – of which there are approximately 320 in the MedTech sector, including Endovastec, Sinomed and iRay Technology – are developing local alternatives to imported products and looking to expand overseas as well.

The plentiful state aid and protectionism outlined in this report are likely to provide ongoing boosters to the competitiveness of China's MedTech players in third markets. The home market advantage afforded to these firms can be projected overseas. Chinese firms can more readily lower margins abroad to secure market share. Such price competition also risks reducing rivals' profitability and their ability to fund further R&D. The high degree of state support within China poses an increasing challenge for all non-Chinese firms around the globe and one that could hinder advances in innovation.

1. INDUSTRIAL POLICY IN THE MEDTECH SECTOR

1.1 The growing scope and impact of China’s industrial policy

Since the mid-2000s, China has pursued an increasingly ambitious and distorting industrial policy. Initially, Beijing aimed to ascend global value chains in high-tech sectors, promoting innovation and developing new growth drivers. But planners have since put greater focus on promoting economic security and technological self-reliance. The industrial policy toolbox has been adjusted. While Beijing still intervenes in markets using direct subsidies and state-owned enterprises (SOEs), it is increasingly keen on certain market mechanisms to advance its goals, including financial market and private sector guidance. This makes it more difficult to pinpoint state support.

Exhibit 1: Key Chinese industrial policy plans

PLAN	MAIN INDUSTRIAL POLICY GOALS
2006: Mid- to long-term Plan for Science and Technology (2006-2020) and 16 Megaprojects (2006-2015)	<ul style="list-style-type: none"> ■ Promote innovation as new growth driver and catch-up with leading economies
2010: 20 Strategic Emerging Industries (2010-2020)	<ul style="list-style-type: none"> ■ Promote innovation as new growth driver and catch-up with leading economies ■ Develop future industries
2016: Innovation-Driven Development Strategy	<ul style="list-style-type: none"> ■ Promote innovation as new growth driver and catch-up with leading economies ■ Develop future industries
2016: Made in China 2025	<ul style="list-style-type: none"> ■ Promote innovation as new growth driver and catch-up with leading economies ■ Develop future industries ■ Replace foreign producers
2021: 14th Five-Year Plan (2021-2025)	<ul style="list-style-type: none"> ■ Promote innovation as new growth driver and catch-up with leading economies ■ Develop future industries ■ Replace foreign producers ■ Foster technological self-reliance

The widening scope of China’s industrial policy is linked partly to external developments. Beijing has had a long-standing focus on improving China’s self-reliance, but US sanctions against Huawei and ZTE, followed by export controls on semiconductors, dialed up economic security concerns so they now eclipse economic development as the main driver

of industrial policy. China's government is doubling down on protecting its economy from external disruptions and geopolitical challenges by reducing its dependence on foreign suppliers.

Crucially for Europe, the impact of China's industrial policy extends beyond its domestic economy. China's economic size means its policy slant is reshaping the role and competitiveness of foreign firms, both within China and in global markets where they compete with Chinese counterparts. The combined impact of direct or indirect policy support, market protection, and party guidance molds the competitiveness and market access of foreign companies.

1.2 China's industrial policy toolset in the MedTech sector

1.2.1 Top-level guidance outlines MedTech priorities

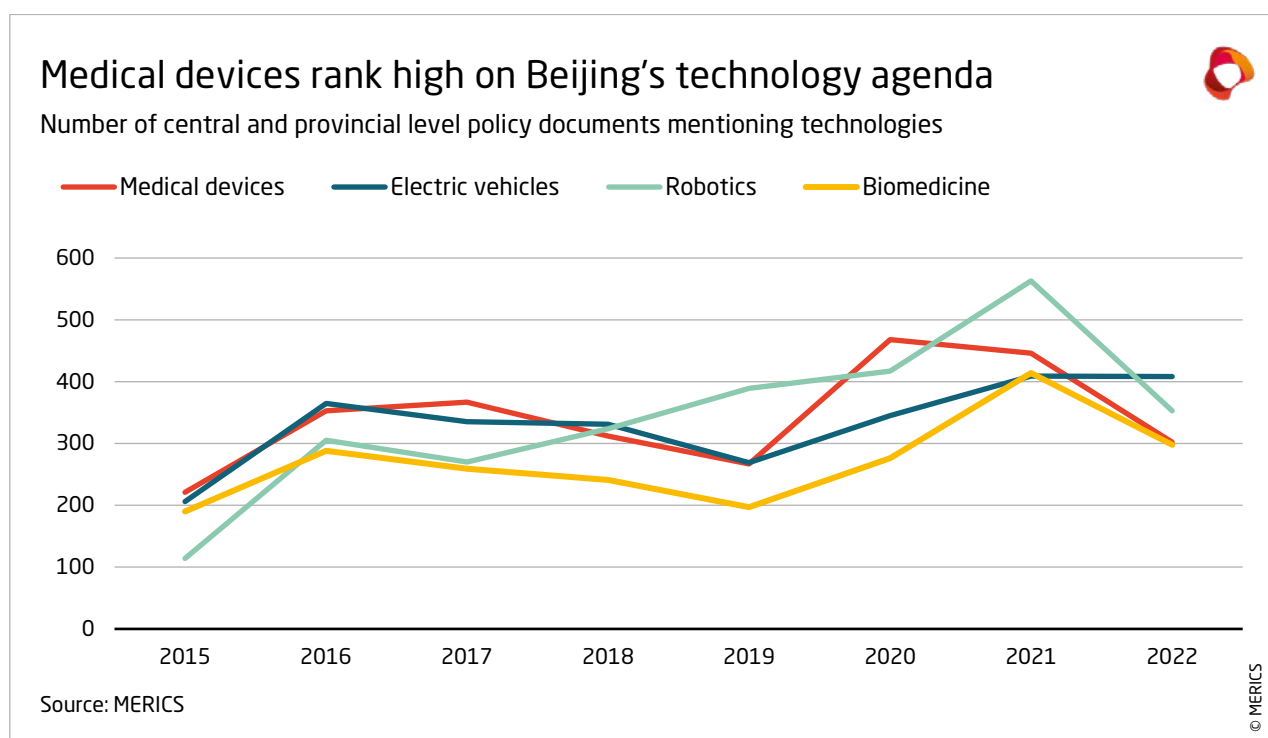
The MedTech sector is closely aligned with Beijing's ambition to move up the value chain and secure China's position as a global manufacturing superpower. MedTech is a high-tech industry characterized by innovation, modernization, digitalization and AI applications. All these factors, combined with China's import dependencies, have made it a magnet for state support over the last twenty years. It receives equal or more attention than other prominent high-tech sectors like electric vehicles or robotics (see exhibit 2).

Beijing's urgency toward domestic capabilities in the sector is strengthened by the country's aging population – and the associated need to improve public health as outlined in the 2016 Healthy China 2030 strategy – coupled, more recently, with geopolitical tensions that have reduced access to foreign technologies. A strong domestic medical device industry is a matter of pride for Beijing, regardless of any national security and economic concerns. Advanced MedTech firms symbolize China's modernization and global prowess and so are treated with the same importance as developing China's own passenger aircraft, the C919.

Central government support goes back to at least 2006, with the 16 Science and Technology (S&T) Megaprojects initiative; two megaprojects were focused on medical devices. Under the S&T Megaprojects umbrella, universities, research institutes and companies competed for government research funding and support. In 2010, medical devices were listed in the 20 Strategic Emerging Industries policy, garnering a plethora of policy support at central, provincial and local levels. In 2015, the Made in China 2025 strategy set two high-level MedTech targets for 2025: Chinese manufacturers should hold a 70 percent market share for medium- and high-end medical devices in county-level hospitals, and achieve a minimum 85 percent localization rate for core components.

Government support has become ever more detailed. In 2010 the government started to dedicate a sector-specific five-year plan to medical devices. Policy priorities have remained relatively constant, with the main focus on achieving breakthroughs in technological bottlenecks and cultivating a small set of globally competitive enterprises. What's noticeable is the shift away from highly quantitative targets such as the number of patents or technologies toward a greater focus on high-quality company development.

Exhibit 2



For the medical device sector, Beijing is following a similar industrial policy blueprint to other strategic sectors like robotics or pharmaceuticals. The government is:

- **Leveraging its state-driven investment** in digital infrastructure like 5G by encouraging firms to digitalize their manufacturing processes and develop new smart MedTech devices and services like telemedicine
- **Guiding the financial system to provide capital to highly innovative Chinese MedTech firms** by instructing state-owned banks to increase lending, and by highlighting the MedTech sector, as well as specific Chinese MedTech companies, as “supportable”, thus inducing private investors to channel capital toward them
- **Boosting China’s medical equipment technological self-reliance** by channeling public and private research into institutes and companies developing replacements for technologies that need to be imported
- **Promoting growth by creating demand for high-end medical equipment**, such as through cheap loans for medical institutions
- **Cultivating Chinese brands** by creating a favorable market and innovation environment for them and discriminating against foreign firms
- **Setting global standards** by leveraging China’s state-orchestrated standardization system
- **Leveraging its huge domestic MedTech market**, which is the largest after the US market and was estimated at EUR 135 billion (CNY 958 billion) in 2022, to incentivize foreign producers to localize production, sourcing and development⁴

Exhibit 3: China’s top-level plans for the development of the MedTech sector

FIVE-YEAR PLAN	COMMON TARGETS	SPECIFIC GOALS
12th Five-Year Special Plan for the Medical Device Science and Technology Industry (2011-2015)	Achieve breakthroughs in technological bottlenecks including in: <ul style="list-style-type: none"> ■ Established high-tech medical devices such as CT, MRI, PET ■ New medical devices such as POCT, medical robots and molecular biological analysis instruments 	Breakthroughs in 20-30 key technologies and core components Patent 200 core technologies Support 10-15 large medical device enterprises Establish 8-10 medical device industrial bases Focus on developing 64-row spiral CT
13th Five-Year Special Plan for Scientific and Technological Innovation of Medical Devices (2016-2020)	<ul style="list-style-type: none"> ■ High-precision components such as pump valves, micro-sensors, micro-optical lenses ■ Medical materials and consumables such as interventional stents and artificial joints Replace imports with domestic production Promote innovation instead of imitation by strengthening basic research	Breakthroughs in 1-3 original innovative technologies and 10-20 leading-edge technologies Patent more than 300 technologies Cultivate 8-10 large medical device enterprises Establish 8-10 medical device tech clusters Focus on developing 256-row spiral CT
14th Five-Year Plan for the Development of the Medical Equipment Industry (2021-2025)	Develop and integrate digital technologies into the medical device sector Accelerate the global expansion of Chinese-made and Chinese-innovated products	Cultivate 6-8 companies that rank among the top 50 global medical device firms Focus on developing new health care services such as tele-, smart, mobile and high precision medicine Develop several highly specialized manufacturing champions and Little Giant enterprises

However, there are some important differences between the medical devices sector and other targeted areas. Its R&D intensity and varied technologies, most with a high degree of specialization, create roadblocks. To overcome these, the government is betting on high-tech SMEs and funneling capital into basic research. A major advantage for the government is that it has direct control over most end consumers: hospitals and other medical institutes. State procurement therefore plays an outsized role as an industrial policy lever in the MedTech sector.

1.2.2 Beijing leverages its innovation ecosystem to deliver breakthroughs

Innovation is a key part of China’s efforts to move up value chains and improve resilience in the MedTech sector. Beijing has started to intervene more strongly in China’s innovation landscape to align it more closely with national strategic goals, which depend upon fostering the innovation capacity of Chinese firms. Reforms announced in 2016 were meant to improve the transparency and efficiency of public research funding and institutes. After 2018, these reforms gained urgency and a stronger emphasis on reducing foreign tech reliance, following US restrictions on China’s access to key technologies. Beijing has since sought – in President Xi Jinping’s words – “to make the most of the socialist system’s unique capability to concentrate resources.”

Chinese MedTech companies have benefited from this general trend. Medicine and medical technology are consistently included in official and semi-official lists of strategically important technologies and sectors.

Exhibit 4: Medical research features prominently in China’s top-level S&T plans

MAJOR S&T PLANS	MEDICAL TECHNOLOGY FOCUS
2006: S&T Megaprojects	<ul style="list-style-type: none"> ■ State Council listed 16 top research priorities toward 2020, two of which relate to healthcare.
2015: Made in China 2025	<ul style="list-style-type: none"> ■ “Biological medicine and high-end medical devices” is one of ten key sectors. Semi-official documents set a goal of 50 percent self-reliance in high-performance medical devices by 2020 and 70 percent by 2025.
2016: S&T Megaprojects toward 2030	<ul style="list-style-type: none"> ■ State Council listed 16 top research priorities up to 2030, two of which relate to healthcare.
2017: Foreign Technology Strangleholds	<ul style="list-style-type: none"> ■ “Cross-Linking and Immunoprecipitation (iCLIP) technology” and “Components for medical imaging equipment” appeared on a semi-official list of 35 “foreign technology strangleholds” that China faces, highlighting dependencies on foreign CT and MRI scanners.⁵
2020: Strategic Emerging Industries (SEI)	<ul style="list-style-type: none"> ■ The biotech industry is one of eight priority sectors in this central government catalog which directs local support policies. Medical equipment is also supported through “the high-end equipment manufacturing sector”. Health, medicine and elderly care are target areas in another SEI, on digital services.
2021: 14th Five-Year Plan (2021-2025)	<ul style="list-style-type: none"> ■ “Genetics and biotechnology” and “Clinical medicine and health” are two of the seven prioritized “cutting-edge S&T fields”. Medical equipment is highlighted in the preceding paragraph. “Biomedical imaging facilities” are part of the planned major research infrastructure. Chapter 44 addresses healthcare system reform, including speeding up approval for medical devices that have been marketed overseas.

The reforms to the science and technology system that Beijing launched in 2016 are part of a larger trend toward more central control and coordination.

In line with this, reorganizations of the central government put ministries in charge of specific tasks. The Ministry of Science and Technology was tasked with leading China's S&T strategy at the March 2023 National People's Congress. Meanwhile, healthcare policy falls under the National Healthcare Commission. The approval of pharmaceuticals and medical devices is the purview of the National Medical Products Administration (NMPA), a subsidiary of the State Administration of Market Reform. Medical data is subject to data regulations, which the Cyber Administration of China enforces. The Ministry of Industry and Information Technology (MIIT) spurs the medical technology sector with industry-led innovation platforms, pilot and demonstration projects, zones and clusters.

For public research labs, a stronger hierarchy means:

- 20 National Labs are China's top institutes. Two of these focus on medical research: the National Lab on Major Disease Research (hosted by the Peking Union Medical College) and the National Lab for Protein Science (hosted by the Institute of Biophysics).
- 500 National key labs support these, 65 of which focus on medical research (excluding traditional Chinese medicine), hosted by universities, hospitals and companies
- Other types of research institutes and engineering centers exist further down the hierarchy. Notably, the NMPA announced a program for medical research labs in 2018, approving 117 in two batches. 30 of these labs focus on medical technology.

Beijing also seeks to improve synergies in the innovation ecology with subsidized platforms. As part of Made in China 2025, 19 National manufacturing innovation centers have been set up since 2016, three of which are relevant to medical technology: a robotics center in Shenyang launched in 2018; a sensors center in Shanghai, founded in 2018; and one on advanced medical devices (NMED), set up in Shenzhen in 2020.⁶ Additionally, NMPA approved 14 Regulatory Science Research Bases in 2021 that focus on co-innovation in medical technology.

The NMED is housed at the Yesun Science and Technology Park, which is part of the Guangzhou-Shenzhen-Hong Kong Greater Bay Area's plan to integrate innovation resources. Starting points for mapping zones more generally, as well as tracing related subsidies, include:

- The yearly top 100 of biopharma zones ranked by the China Center for Information Industry Development, a think tank under the MIIT.
- The national list of 45 advanced manufacturing clusters by MIIT. Five of these are in medical technology, centering on Shenzhen, Shanghai, Suzhou, Wuxi and Beijing.
- Local industrial and innovation policy, especially in large city clusters around Beijing, Shanghai, Guangzhou (the Greater Bay Area) and Chongqing-Chengdu

1.2.3 Policymakers channel capital to Chinese MedTech firms

Beijing is developing a new blend of state capitalism. Alongside its traditional ways to finance national champions, such as subsidies and below-market credit, the government has started to guide financial markets toward national technological priorities such as the medical device sector. Policymakers regard government steerage as complementary to market forces, which the government wants to harness for its political goals.

On the financial side, China's industrial policy toolbox includes:

- **Tying subsidies to winning volume-based procurement (VBP) tenders or license approvals:** Certain local governments, for instance, Wuhan city government, gives one-time awards of up to EUR 1.4 million (CNY 10 million) to companies that have successfully registered for Class II and III medical devices. Likewise, Wuhan offers EUR 280,000 (CNY 2 million) to firm that earn ratifications from the US Food and Drug Administration, the European Medicines Agency, or the World Health Organization. Local governments in provinces like Hainan or cities like Shenzhen also offer subsidies for local companies that win national volume-based procurement (VBP) tenders.⁷
- **Helping fund R&D expenditure:** Beijing funds companies' research projects into medical devices and components (most national and provincial level research projects are open to firms registered in China), thereby helping them outsource R&D costs. The government goes a step further for specific projects. For instance, the Ministry of Industry and Information Technology and the food and drug watchdog, the National Medical Products Association (NMPA), are supporting companies that research biomedical materials ((polymer, metal and inorganic non-metallic materials) with preferential policy support and resources, plus promising to procure successfully commercialized products, akin to a pre-commercial procurement agreement.⁸
- **Tweaking the tax system to promote innovation:** The government has long tried to support corporate R&D through tax incentives. In 2021, the government expanded the super tax deduction for R&D expenses granted to manufacturing firms from 75 to 100 percent to encourage greater spending on innovation-related activities.⁹ For high-end manufacturing sectors, the government will also refund incremental retained value-added tax credit on a monthly basis to encourage equipment upgrades and technology investments.
- **Bankrolling Chinese MedTech companies' preferential loans:** Providing domestic companies with access to cheap, below-market financing – so that loan terms are more favorable than is generally available – is one of Beijing's most tried and tested financial instruments in the industrial policy sphere. China's state-owned banking system is suited to this type of financial support. Research by the Organization for Economic Cooperation and Development (OECD) has shown that below-market credit contributes to the buildup of excess capacity which can lead to loss of market share for foreign producers.¹⁰ Recently, below-market loans have

been extended to a wider range of firms, such as the Little Giants, a government list of high-tech SMEs (see chapter 1.3.3).

- **China as an investor state:** Over the last decade, Beijing has increased the supply of equity capital available to firms in strategic sectors through government guidance funds. They have become one of the main tools to channel capital directly into industrial policy objectives. Essentially, China’s central or, more often, provincial and local governments set up venture capital type funds to invest in Chinese firms. These tend to be in specific industries like the MedTech sector. Government guidance funds are also meant to steer private investment, though this target has often fallen flat.
- **Channeling private investment into “certified sectors and companies”:** One of the most powerful tools at Beijing’s disposal is to guide private financial markets toward strategic goals. Incentives for investors to heed government signaling have grown exponentially in recent years, especially after Beijing’s technology rectification campaign, which damaged the valuation of internet companies, and its decision to wipe out the tutoring industry. Chinese investment bank reports now often showcase how their highlighted companies align with Beijing’s technological priorities. As we will show, government-certified companies, like the Little Giants, benefit from additional equity infusions by capital markets. Companies in strategic sectors receive subsidies and government support toward their market listings.
- **Sometimes providing below-market energy:** According to the OECD China does not provide widespread below-market energy for industrial uses. However, in specific provinces, government officials might use cheap or even below-market energy to attract producers. China has also benefited from purchasing comparatively cheap Russian energy resources.

These support measures are unique and give Chinese firms an advantage on the global stage. In Europe, for instance, firms do not receive similar levels of government support, though the European exceptions include certain types of member-state level support programs to promote R&D in MedTech.

1.3 China’s approach to localization harms foreign companies

There is no intrinsic reason why China’s strategic support for the MedTech sector might not benefit foreign companies there, for instance by supporting local investment in R&D, and this has sometimes happened. However, Beijing has also created multiple policy measures designed to support Chinese companies at the cost of foreign firms.

1.3.1 China strives to minimize imports of MedTech products

Although policymakers have long wanted China to climb global value chains in high-value-added sectors like medical devices, the country remains reliant on imports of medical devices and components, especially in high-end segments. Supply shortages experienced

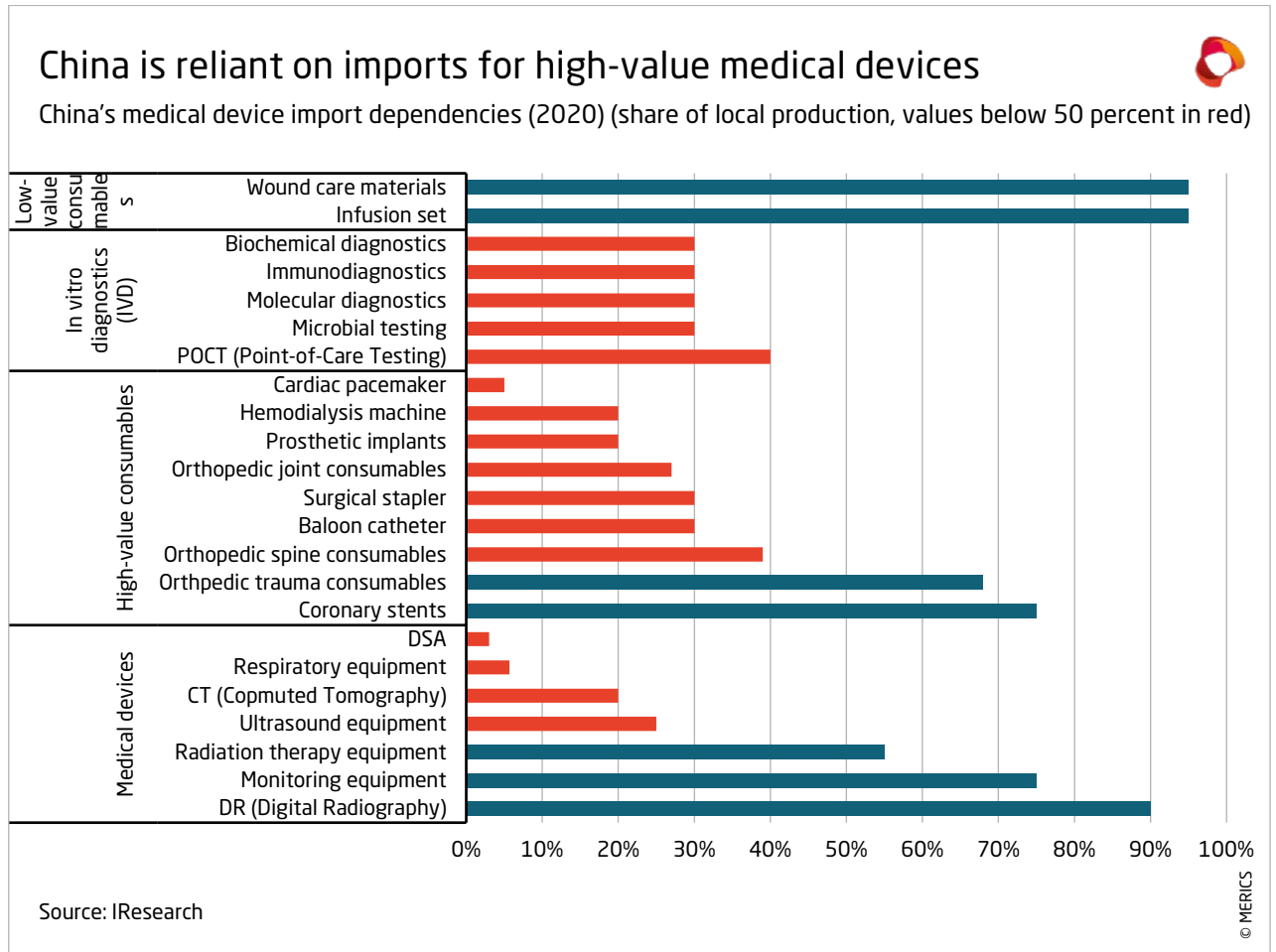
during the 2020 Covid-19 outbreak added to policymakers' worries about the safety of the industrial supply chain and amplified the localization drive. President Xi Jinping remarked in March 2020 that "it is necessary to speed up filling the shortcomings of China's high-end medical equipment industry [...] and realize the independent control of high-end medical equipment".

Hence it comes as no surprise that localization is a core tenet of China's current medical equipment blueprint, the sector's 14th Five-Year Plan. It states that by 2025 China needs to establish safe and reliable industrial chains and achieve control of core technologies (including extracorporeal membrane oxygenation [ECMO] and ultrahigh field magnetic resonance imaging) as well as basic materials and components.

Since then, Beijing has released a raft of measures to strengthen domestic firms and induce foreign firms to localize production and development. They include:

- **Boosting foreign investment in high-tech medical devices:** The 2020 edition of China's Encouraged Foreign Investment Catalog added several types of medical equipment including AI-driven medical equipment, ventilators and ECMO machines.¹¹ In 2022, dental and hearing aid-related technologies were added. Investments linked to these products benefit from tariff exemptions on imported equipment, preferential land prices and lower corporate taxes.
- **Creating demand for locally produced medical equipment:** The People's Bank of China – the country's central bank – issued an interest discount policy in 2022 for equipment renewal loans. EUR 28.3 billion (CNY 200 billion) was allocated for medical equipment, enabling medical institutions to apply for subsidized loans. The original policy document did not state any preference about where such medical devices originate, but media reports have indicated the PBOC will prioritize support for purchases of Chinese brands or equipment listed in the "Guidance Catalog for the Promotion and Application of First Set of Major Technical Equipment".^{12,13} As will be shown, government directives favor domestically produced equipment renewals and limit imports of medical devices.
- **Restricting cross-border data transfer:** Chinese data and cybersecurity regulations have upped the pressure on foreign companies to invest yet more in China to process data locally and continue serving the market. Often this means more R&D must also be undertaken in China. In some areas, companies are even finding themselves forced to build self-sufficient digital systems. In AI, for example, China is establishing its own standards and ethical principles.
- **Praising the localization of foreign firms:** State media applauds the localization efforts of foreign companies, which hope in turn that their investments will help them gain favor with regulators and cadres.¹⁴ Siemens Healthineers' Greater China President Jerry Wang remarked that the NMPA's acceptance of his company's 7T MRI MAGNETOM Terra is linked to localized R&D.

Exhibit 5



1.3.2 Procurement plays primary role in promoting domestic players

The most important policy lever Beijing holds in the sector is state procurement. More than any other sector, foreign healthcare equipment firms suffer from market access difficulties and discriminatory state procurement in China, according to the European Chamber of Commerce in China (EUCCC).¹⁵ The government can use procurement as a tool to develop domestic players because 85 percent of medical care is provided by public hospitals.¹⁶

Medical devices face the worst market access conditions in China

A survey of European companies in China conducted by the EUCCC in 2023 revealed that 94 percent of medical device sector companies (N=18) feel they have missed business opportunities because of market access restrictions.¹⁷ This compared to 62 percent (N=447) for all sectors and was the highest of any sector. Medical device companies also felt most strongly that recent regulatory changes had negatively impacted their business environment. While 64 percent of all companies (N=570) said business has become more difficult, 79 percent of medical device firms did (N=24), which was once again the highest of all sectors. Looking ahead, 54 percent of medical device manufacturers surveyed do not expect any meaningful opening up or leveling of the playing field to occur.

The legal basis for favoring domestic goods over imports is provided by China's government procurement law. The 2022 revision draft of the law contains language that could be interpreted as meaning products with a high degree of domestic content should be preferred for procurement purposes.¹⁸ Indeed, MIIT issued non-public procurement guidelines (Document 551) in 2021 that require 25, 50, 75 or 100 percent local content in 315 items including X-ray machines, MRI and surgical equipment. The MedTech sector accounts for 57 percent of all items in the catalog.¹⁹ Such practices harm foreign exporters to China. They must either localize or risk losing the Chinese market. Similar internal guidelines listing recommended suppliers and products were previously issued for other sectors like information technology. Such localization measures contravene the World Trade Organization's (WTO) Agreement on Global Procurement, enforced in the EU but not signed by China.

To break through technological bottlenecks at the heart of China's import dependence in high-tech medical devices, policymakers also dangle the carrot of preferential state procurement contracts for China-based producers (including localized foreign ones). A trial program established by the MIIT and National Health Commission invites consortia of medical institutes and China-based medical equipment producers to showcase clinical uses of innovative equipment, which can then be granted priority procurement.²⁰

Apart from the central level, there has also been a flurry of provincial and local level policies on medical device procurement. Provinces including Anhui, Hubei and Shanxi issued notices to local hospitals that increase the obstacles to importing medical equipment, as it now requires explicit government approval. In Anhui, for instance, approval is granted only if the product is unavailable in China or unreasonably expensive.

Exhibit 6: Local public procurement measures restricting MedTech imports

PROVINCE	POLICY DEVELOPMENT
Anhui (April 2022)	Public hospitals are prohibited from purchasing imported medical equipment without approval (requiring an audit)
Hubei (June 2022)	Preference is given to domestic products as outlined in the national “Administrative Measures for Government Procurement of Imported Products”
Shaanxi (June 2021)	For imports at least one criteria must be met: 1) Item cannot be obtained in China 2) or not on reasonable economic terms 3) the technical specifications of local products do not match imported equipment
Guangdong (June 2021)	2021 List of Products Imported by Provincial Health Institutes dropped from 132 in 2019 to 46 in 2021
Sichuan (April 2021)	Only 59 types of medical equipment can be directly imported
Zhejiang (February 2021)	List of 195 items that can be imported

The government is also rolling out volume-based procurement (VBP), a practice first introduced in the pharma sector in 2018.²¹ The primary purpose of VBP is to slash prices and make health care more affordable. Price cuts have indeed been steep, with pacemaker prices down 47 percent and coronary stents costing 93 percent less.²² But the practice also aims to increase the localization of medical equipment production and drive out foreign producers, given that imports are often not sufficiently price competitive to win VBP tenders. Centralized state procurement lends itself to the pursuit of industrial policy goals. The price cuts associated with VBP could seriously impact medical device manufacturers. Producers of consumables – which come with fewer services attached and can be mass-produced more easily – are likely to be the initial and primary target of VBP.

China’s state intervention in procurement processes is starting to negatively impact foreign medical device producers. The absolute number of contracts won by foreign companies has gone up in most critical product categories like CT scanners or MRI machines, but their relative market share has declined. For now, China’s growing market masks this trend. But once Chinese firms begin to match their foreign rivals in production capacity and technological level, then foreign firms can expect to see their market share shrink further and absolute sales trend downwards too. The CT scanner market demonstrates this: The market share of Siemens, Philips and GE (three foreign producers from our company sample) dropped from 87 to 63 percent between 2015 and 2022.²³ However, the absolute number of CT scanner contracts awarded rose by 730 percent, masking the decline in market share.

Exhibit 7

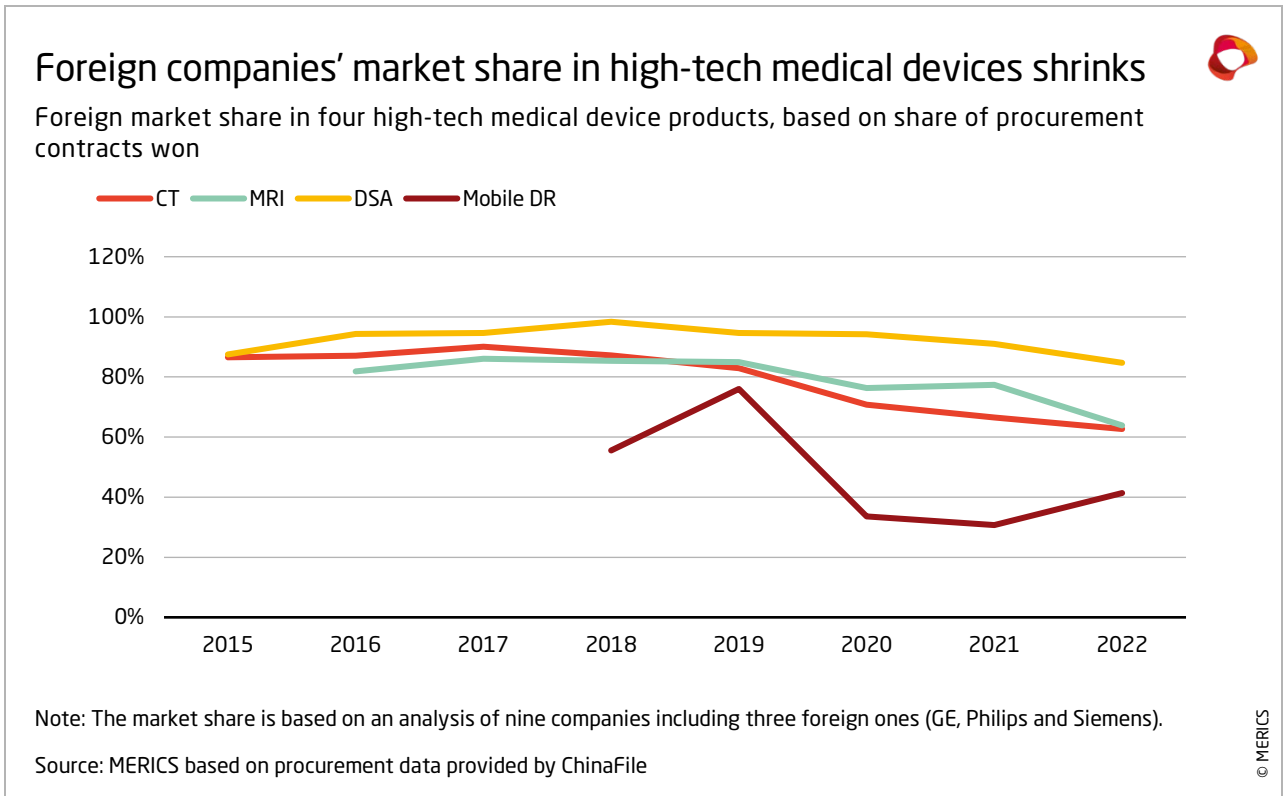
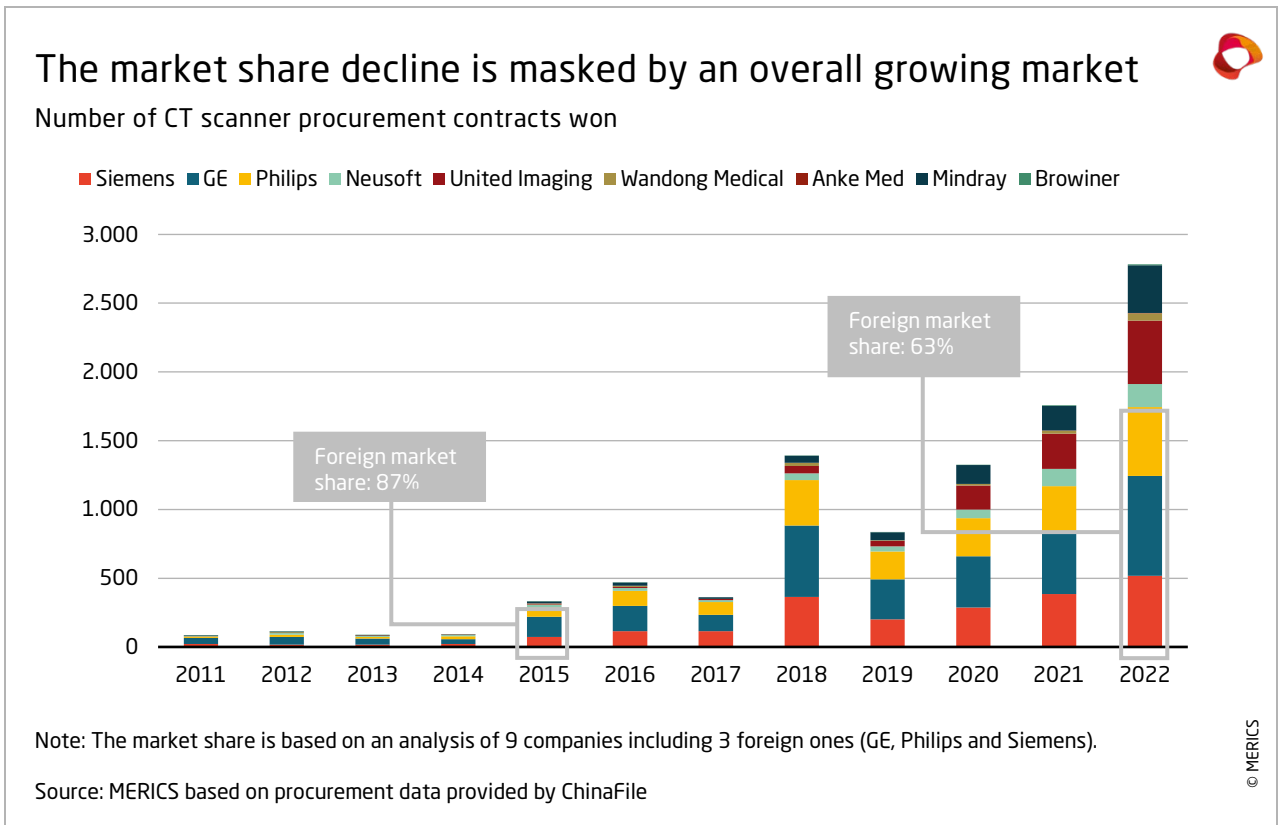


Exhibit 8



1.3.3 Regulatory hurdles disadvantage foreign MedTech producers

Regulatory barriers are one of the primary forms of distortion in China's MedTech sector. Foreign firms report experiencing discriminatory treatment, despite some reform efforts to bring regulations in line with international best practices, such as the revised Regulation on the Supervision and Administration of Medical Devices (Order No. 739).²⁴ The European Chamber's 2022-2023 position paper noted the healthcare equipment sector faces industry barriers related to requirements for inspections and administrative permits.²⁵ It amplified the findings of the chamber's business confidence survey that market access and regulatory barriers in China are highest in the MedTech sector.²⁶

Requirements regarding approval in the 'country of origin (COO)' for imported medical devices are of particular concern. According to COO rules outlined in regulations dating back to 2002, no imported medical devices can be approved in China until they are first approved in either the country of manufacture or the one where the market authorization holder is based.²⁷

The delay caused by COO certification is further compounded by the fact that China requires clinical trials to be conducted in China for high-risk category medical devices – but COO approval is required before clinical trials can begin. In practice, the COO rule results in delaying the entry of foreign products by between one and three years compared to European or US markets. Chinese firms therefore gain time to develop their own products.

The NMPA has made some changes to the COO rules, exempting certain innovative products that qualify for the "Green Channel" review. The Green Channel expedites the approval process for innovative products with Chinese patents, including imported ones. Yet this does little for foreign firms that conduct R&D outside of China and may even disadvantage them.

Moreover, the COO rule may be in violation GATT Article III's national treatment obligations, as identical products with the same characteristics and risks receive more favorable regulatory treatment if they are manufactured in China. These regulations place strong pressure on foreign firms to localize all parts of the design, manufacturing and testing of products in China to qualify for the same regulatory approval pathways available to local firms.

1.3.4 Beijing turns to high-tech SMEs to fill technological bottlenecks

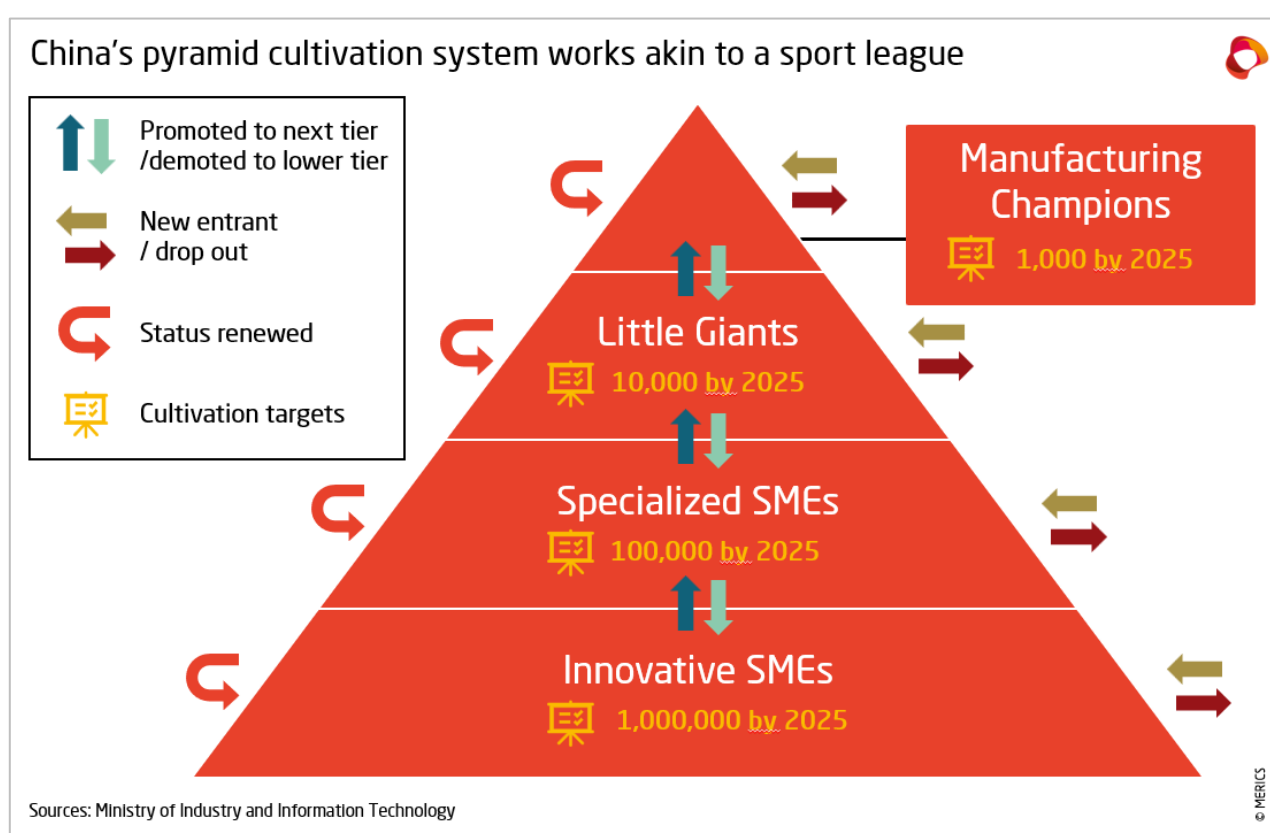
High-tech SMEs have emerged as new recipients of Beijing's industrial policy support. Policymakers have realized the potential of high-tech SMEs to innovate and specialize in niche markets, helping to develop Chinese alternatives to foreign inputs. Beijing has therefore created a comprehensive support system to improve high-tech SME integration in China's innovation ecosystem. The government essentially acts as an "accelerator state" that fast-tracks the development of SMEs in priority sectors.²⁸

However, the government has instilled market forces in this support program. High-performing high-tech SMEs can get a government awarded title that signals their status.

They are then pitted against each other as they must renew the title every three years by outperforming peers to retain preferential policy support.

The system is based on a competitive multi-tier selection process at the provincial and central levels. The lowest-ranked tier consists of “Innovative SMEs” focused on manufacturing, identified at the provincial level. Provincial governments select more advanced “Specialized SMEs” from this group, which get access to various support mechanisms. The top performers are promoted to national “Little Giant” status and, on reaching a certain size, are recognized as industry leaders in subsectors known as “Manufacturing Champions.” The Little Giants and Manufacturing Champions serve as model firms in China’s innovation-driven development. China has established targets for the number of firms wanted in each category by 2025 (see exhibit 9).

Exhibit 9



The cultivation system attempts to cover all the high-tech SME’s potential needs, of which the most pressing is finance. The Little Giant or Manufacturing Champion title both guarantees direct state funding and signals official certification to private investors – who are paying close attention to government signals after recent crackdowns on tutoring and internet companies. The government is facilitating listings for high-tech SMEs with such measures as the opening of a new SME-dedicated stock exchange in Beijing. China’s state-dominated banking system is also ramping up lending to high-tech SMEs. These steps have been hugely successful: Little Giants made up 40 percent of initial public offerings (IPOs) in 2022 on the Shanghai, Shenzhen and Beijing stock exchanges. Of these, 17 were firms in the healthcare sector (some 10 percent of all Little Giant listings in 2022).²⁹

The government is also guiding SOEs and state-owned research institutes and universities to support certified high-tech SMEs as key customers or R&D partners. Beijing has also started to tweak intellectual property rights regulations to support Chinese high-tech SMEs.

Medical equipment is a key sector for Little Giants, which are mainly active in manufacturing sectors highlighted in the 14th Five-Year Plan or the Made in China 2025 strategy. The 14th Five-Year Plan for the Medical Equipment Sector emphasizes the push for Little Giants and Manufacturing Champions with global leadership in specific fields by 2025.³⁰ Out of 9,279 Little Giant enterprises announced in the first four batches, 230 or roughly 2.5 percent are MedTech enterprises (i.e., either in the field of medical devices, in vitro diagnostics or medical consumables).³¹ If this ratio held true for the fifth batch of Little Giant enterprises announced in July 2023, then the current number of Little Giant MedTech enterprises would be about 320 firms.

It is too early to judge the success of the program. However, it is clear that the lines between private and state ownership are becoming more blurred in China's current economic model, as it aims to blend market forces into state intervention. If the high-tech SME promotion push proves successful, it could pose a serious challenge for international MedTech firms, both in China and in third markets.

2. MEASURING THE VOLUME OF STATE SUPPORT

2.1 Quantifying state support in China's MedTech sector

This report strives to estimate the volume of state support directed toward the MedTech sector in China. It is a challenging endeavor due to the opacity of policy mechanisms in operation and the use of regulatory measures that may put foreign firms at a disadvantage. The central government is pushing to increase self-reliance and favor indigenous firms over foreign ones through non-public directives on procurement. Regulatory requirements such as country of origin and clinical trial requirements also put foreign companies at a disadvantage.

Policies to support local firms are crafted so that China can claim plausible deniability toward discriminatory measures. Government distortion of capital markets also occurs indirectly through top-level guidance and state programs. For instance, the Little Giants initiative encourages the flow of financial and other resources from public as well as private actors to specific firms. The lack of data on procurement and localization measures prevents us from producing a comprehensive estimate of the level of state support.³²

2.1.1 Compiling a sample of listed MedTech firms in China

What is possible is to refer to publicly available firm-based data on the financial performance of listed companies in China. These sources give insights into some of the policy mechanisms supporting MedTech Chinese firms, such as subsidies, tax incentives, and below-market financing, even if not the full picture. Added together, they give a conservative estimate for state support, though the full extent is likely to be significantly higher for many firms.

This report analyses the financial data of 122 Chinese MedTech firms listed on the Shanghai, Shenzhen or Beijing stock exchanges. Each firm has been allocated to one of three segments, depending on their main revenue source. The segments are:

- medical devices (55 firms)
- in vitro diagnostics (IVD) (50 firms)
- medical consumables (17 firms)³³

Additional subsets track the data for:

- sample companies granted "Little Giant" status (39 firms)
- sample companies that qualify as SMEs (between 53 and 73 firms in any given year)³⁴

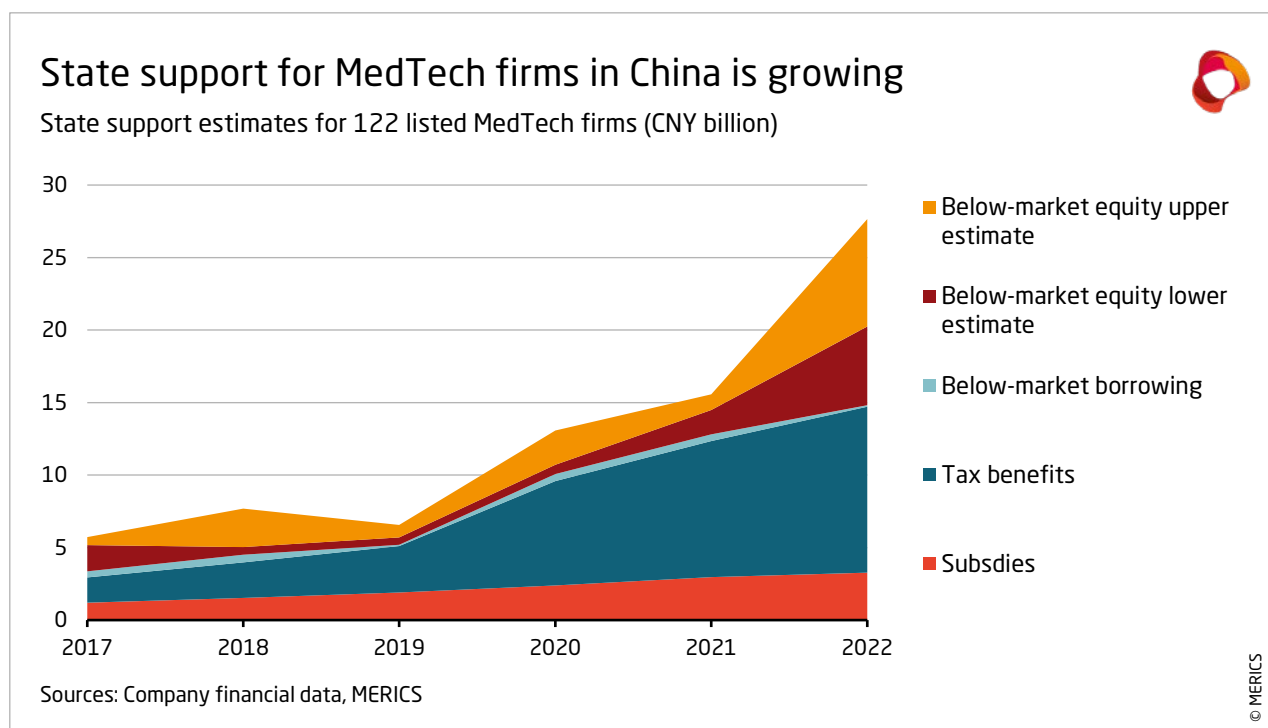
2.1.2 Headline figures for state support

We found the 122 MedTech firms in our sample saw their access to government support grow from EUR 655 million in 2017, to EUR 2.8-3.8 billion in 2022 (from CNY 5 billion to CNY 20-27 billion); these figures were obtained by aggregating their state support from

direct subsidies, tax benefits, below-market borrowing and below-market equity. On top of the uneven playing field created by non-financial or non-measurable industrial policies in the Chinese market, this financial support exacerbates the lack of fair competition between Chinese and foreign firms.

Beyond the subsidies data, taken directly from company financial reports, we have estimated other forms of state support. Tax benefits include tax deductions for R&D activities and preferential tax rates for high-tech firms. These estimates include two forms of below-market financing, as identified by the OECD. Below-market borrowing refers to loans provided with discounted interest rates. Below-market equity involves additional equity contributions made to firms through state actors or government guidance. Given the opaque nature of this form of state support, we have provided upper and lower estimates to show its potential extent.

Exhibit 10

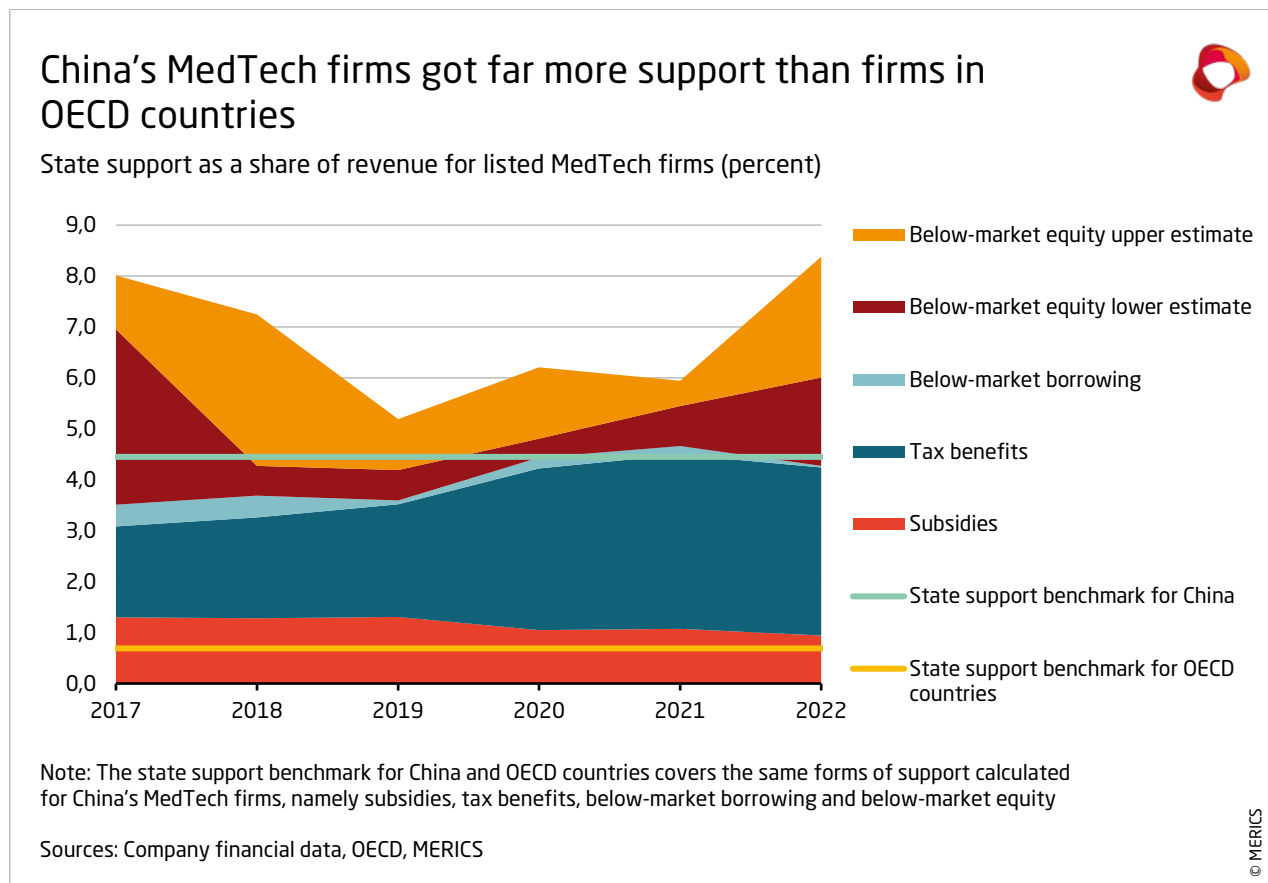


These figures show how measurable forms of state support impact the bottom line for China’s MedTech firms. Over the 2017 to 2022 period, measured state support was equivalent to 5.3 percent or 6.8 percent of company revenue on average, depending on whether one takes the lower or upper estimate of below-market equity into account. Put another way, state support amounted to 25 percent / 31 percent of company net profit, or 69 percent / 86 percent of company expenditure on R&D, based on the lower / upper estimate of below-market equity respectively.

OECD analysis of government grants, tax concessions and below-market financing for firms in China over the 2005 to 2019 period indicates state support accounted for approximately 4.45 percent of revenue, in a survey of 13 sectors. This compared with 0.69 percent of revenue for firms in OECD countries.³⁵ The results of this study into the

MedTech sector in China are therefore in line with expectations. The OECD data underscores the gulf between China and OECD countries in the volume of direct and indirect subsidies granted to firms.

Exhibit 11



2.2 State support through direct subsidies and tax concessions

2.2.1 MedTech is a magnet for subsidies in China

The volume of subsidies granted to MedTech firms has steadily increased in recent years. In 2022, EUR 462 million (CNY 3.27 billion) in subsidies went to the 122 firms, equivalent to an average of EUR 3.8 million (CNY 26.8 million) for each company. The medical device segment's firms got the most subsidies on average, equal to EUR 4.0 million (CNY 28.1 million) each in 2022.

Exhibit 12

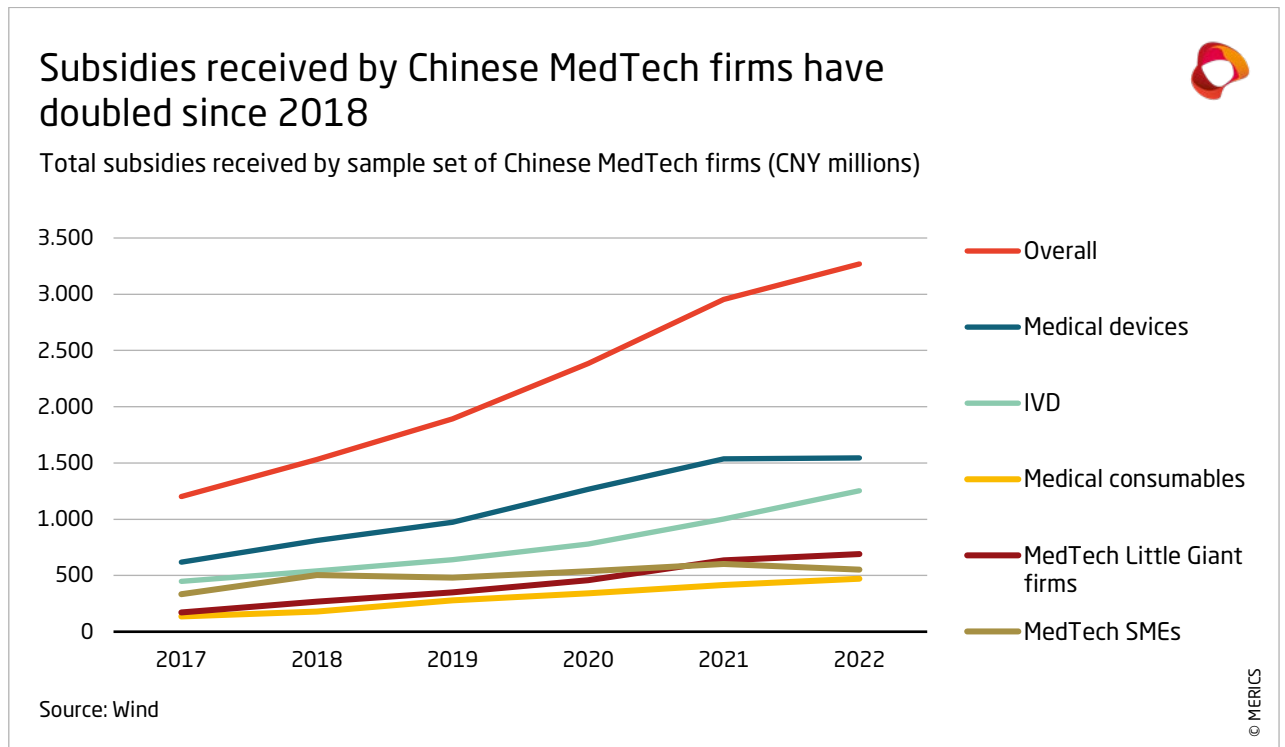
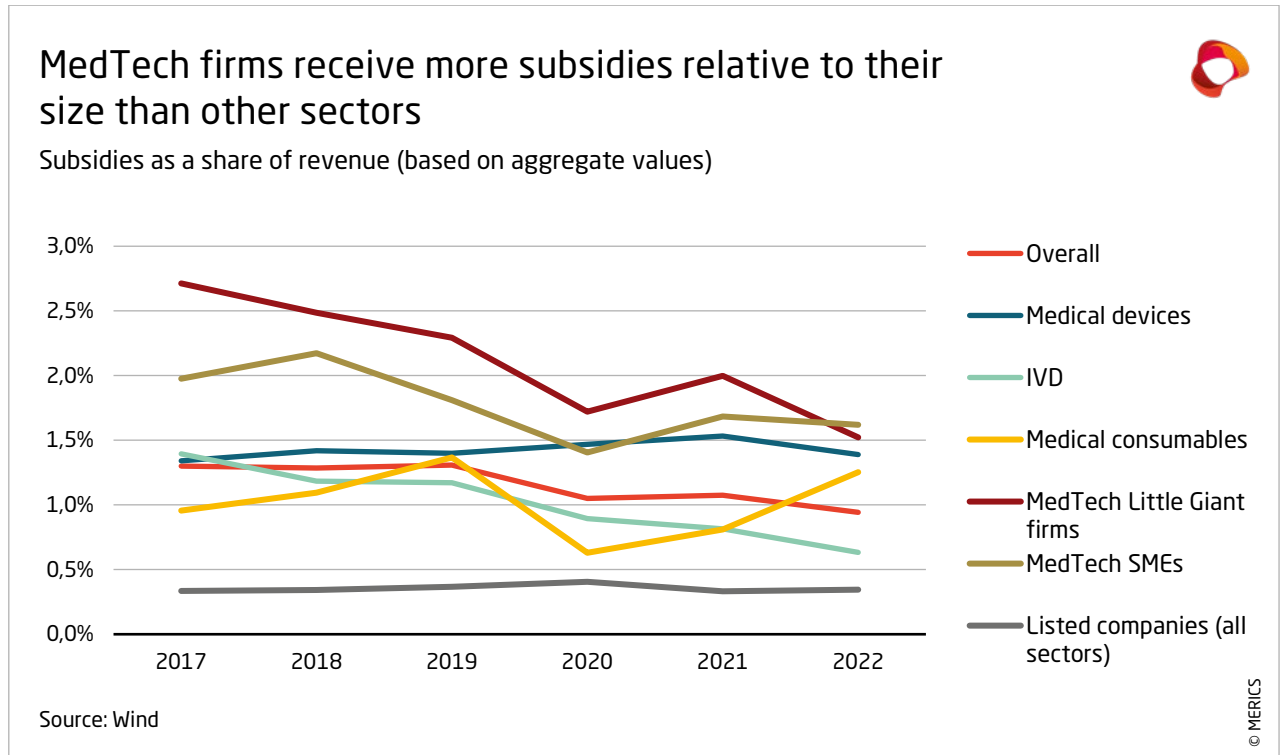


Exhibit 13



Since 2017, the ratio of subsidies to revenue for MedTech firms fell slightly from 1.3 percent to 0.9 percent. Yet it was still more than twice the average for all listed firms on the Shanghai, Shenzhen and Beijing stock exchanges. MedTech companies therefore receive more subsidies relative to their revenue than firms in other sectors: The ratio is highest for MedTech Little Giant companies and MedTech SME enterprises.

2.2.2 Tax benefits are a key form of financial support

Several kinds of tax benefits are available to high-tech manufacturing firms in China, including MedTech ones.³⁶ Firms can qualify for a reduced 15 percent income tax rate, down from 25 percent, based on their status as high and new technology enterprises (HNTE). In 2021 the central government introduced monthly value-added tax credit refunds for advanced manufacturing firms to encourage equipment upgrades and investment in technology.³⁷ It has also implemented regulations to incentivize investment in R&D, by allowing eligible industries to accelerate the depreciation of fixed assets and deduct part of their expenses on overseas R&D activities from their taxable income.³⁸

China's Enterprise Income Tax Law allows companies to deduct 100 percent of their R&D expenses from their taxable income.³⁹ The percentage has grown since 2008 when new rules introduced an additional "Super Deduction" of 50 percent on R&D expenses.⁴⁰ It was raised to 75 percent for manufacturing enterprises in 2018 and again to 100 percent in 2021.⁴¹ As a result, the total level of tax-deductible R&D expenses for manufacturing enterprises reached 200 percent in 2021.

This study uses the data available in company financial statements to track the tax concessions received based on their HNTE status and R&D expenses. This approach does not cover all tax incentives, but rather provides a conservative estimate.⁴² The results show:

- Tax benefits for the 122 MedTech companies have grown from EUR 222 million (CNY 1.7 billion) in 2017 to EUR 1.61 billion (CNY 11.4 billion) in 2022, a six-fold increase.
- Average tax concessions for each firm have risen from EUR 1.9 million (CNY 14.3 million) in 2017 to EUR 13.3 million (CNY 93.8 million) in 2022.
- For Chinese MedTech firms, tax deductions have been worth about 2.6 percent of revenue in recent years and are trending upwards. For MedTech SMEs and MedTech Little Giant firms, this ratio has been above 3.7 percent since 2020.

Exhibit 14

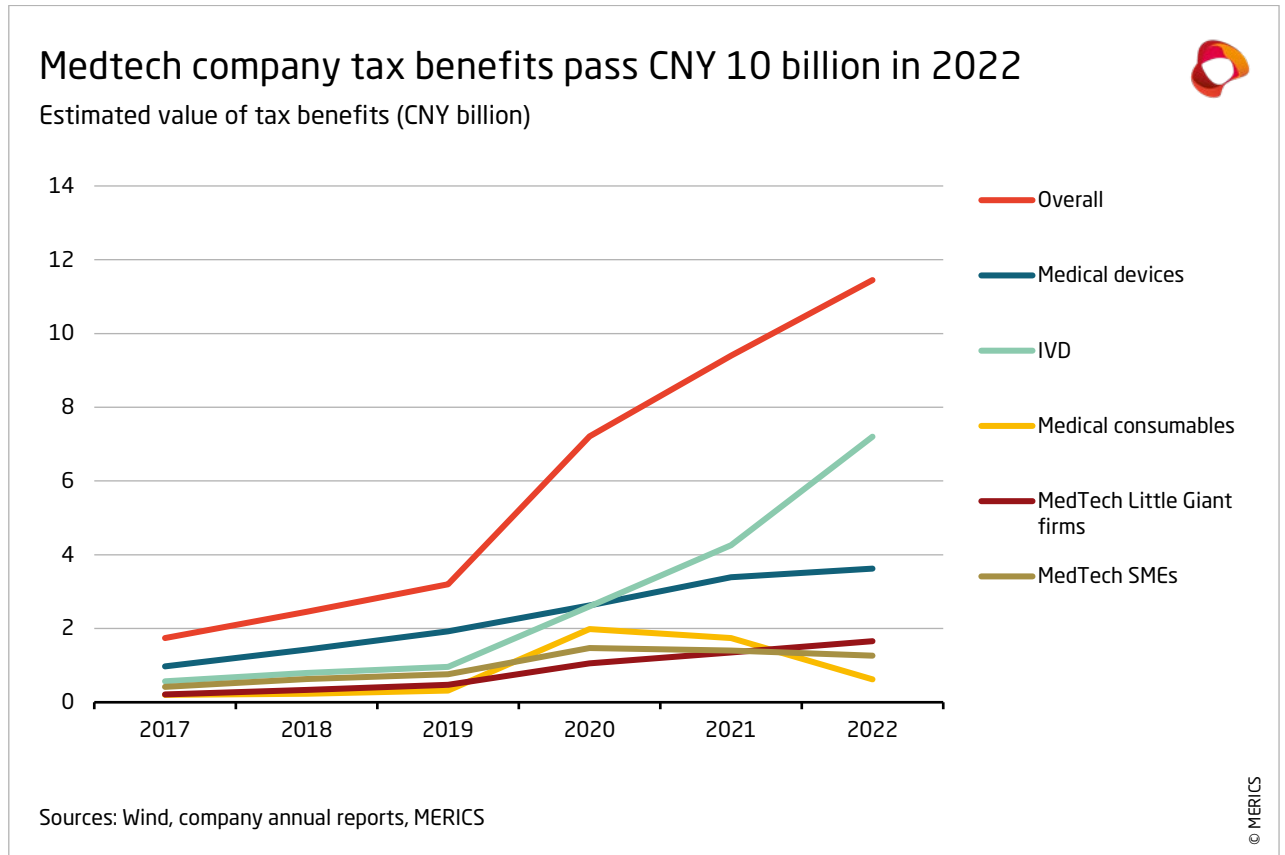
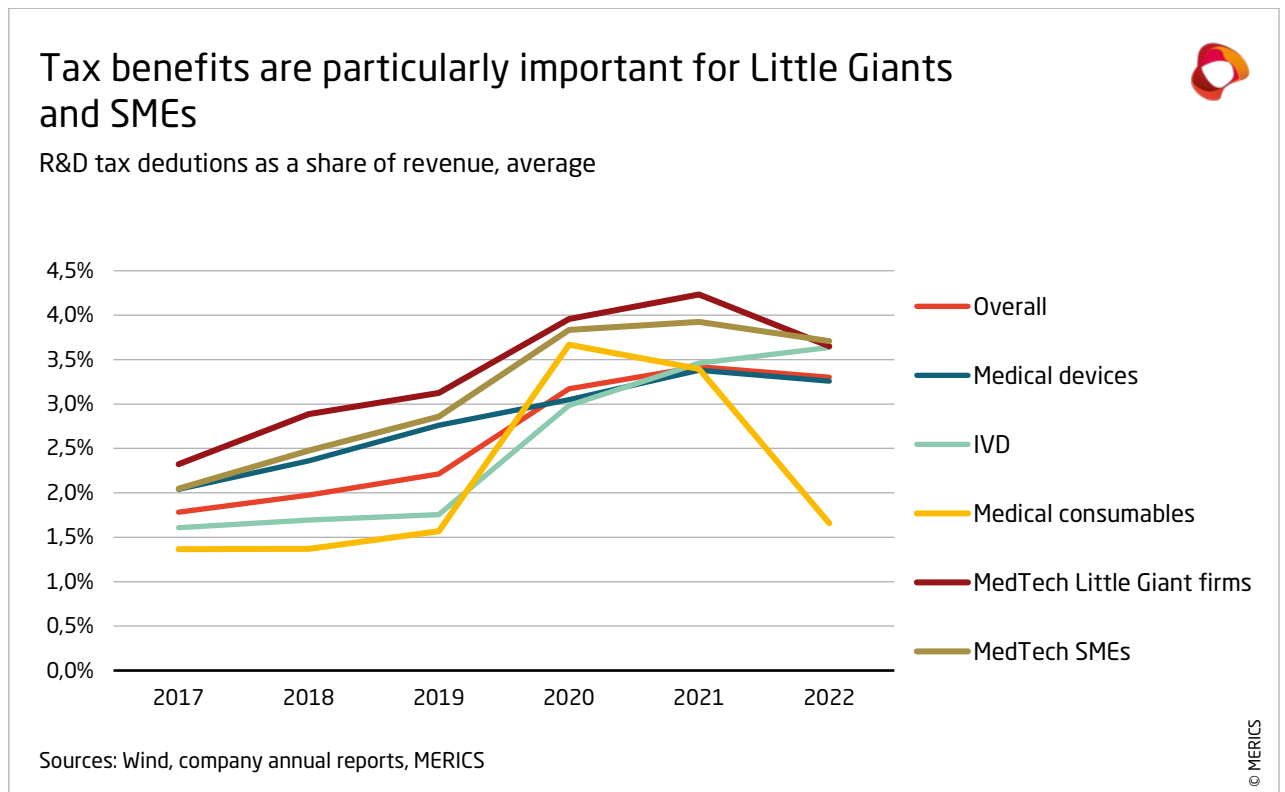


Exhibit 15



2.3 Below-market financing delivers additional support

China's state-controlled financial system grants it the ability to supply cheap equity and debt to enterprises in strategic sectors, including the MedTech sector.

2.3.1 Below-market equity boosts capital injections

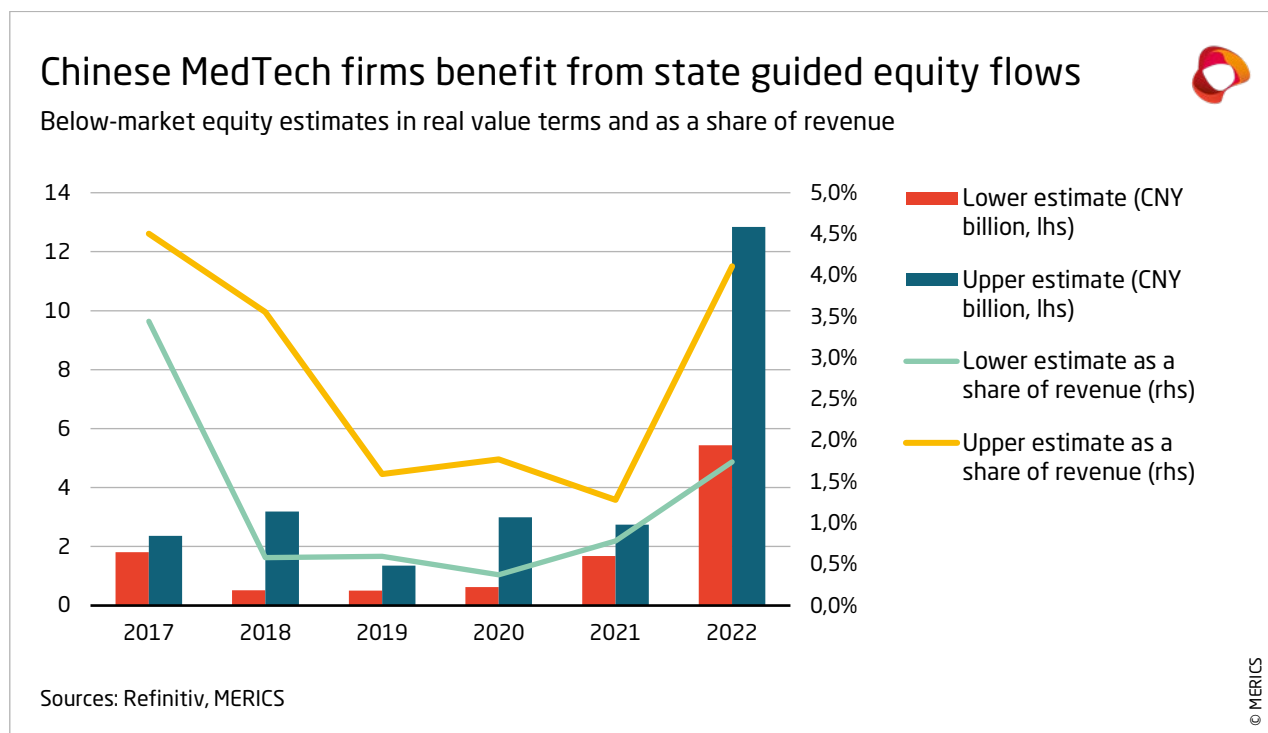
Below-market equity (BME) refers to the government provision of equity finance on terms that are better than the market, for example by itself providing additional equity on non-market terms.⁴³ Government signalling also sways private actors to invest in certain sectors and government-endorsed companies, thus providing additional capital beyond what could be expected without government intervention. Directives to guide investments toward priority sectors, including biotechnology and medical devices, are found in the Made in China 2025 strategy and the 14th Five-Year Plan.⁴⁴

Due to the opaque nature of below-market equity, we derive two estimates for its value based on the comparison of price-earnings (PE) ratios.⁴⁵ For the lower estimate, we use the average PE ratio of foreign firms plus one standard deviation as a benchmark for capital allocation according to free market principles.⁴⁶ Any PE ratios of Chinese firms above that are counted as indicating below-market equity (BME). If any additional capital contributions were made to the firm that year, a proportional amount is counted as BME, based on how much higher the firm's PE ratio is above the benchmark. For the upper estimate, we set the average PE ratio of foreign firms as the benchmark and count any PE ratios of Chinese firms above that as indicative of BME.⁴⁷

The estimates produced indicate that:

- At the lower estimate, between 2017-2022, the 122 Chinese listed MedTech companies benefited from EUR 236 million (CNY 1.8 billion) in below-market equity each year on average, equivalent to 1.3 percent of revenue on average.
- At the upper estimate, the same firms benefited from EUR 551 million (CNY 4.2 billion) in below-market equity each year on average between 2017-2022, equal to 2.8 percent of revenue on average.
- Below-market equity peaked in 2022, at a range of EUR 0.8-1.8 billion (CNY 5.4-12.8 billion).

Exhibit 16



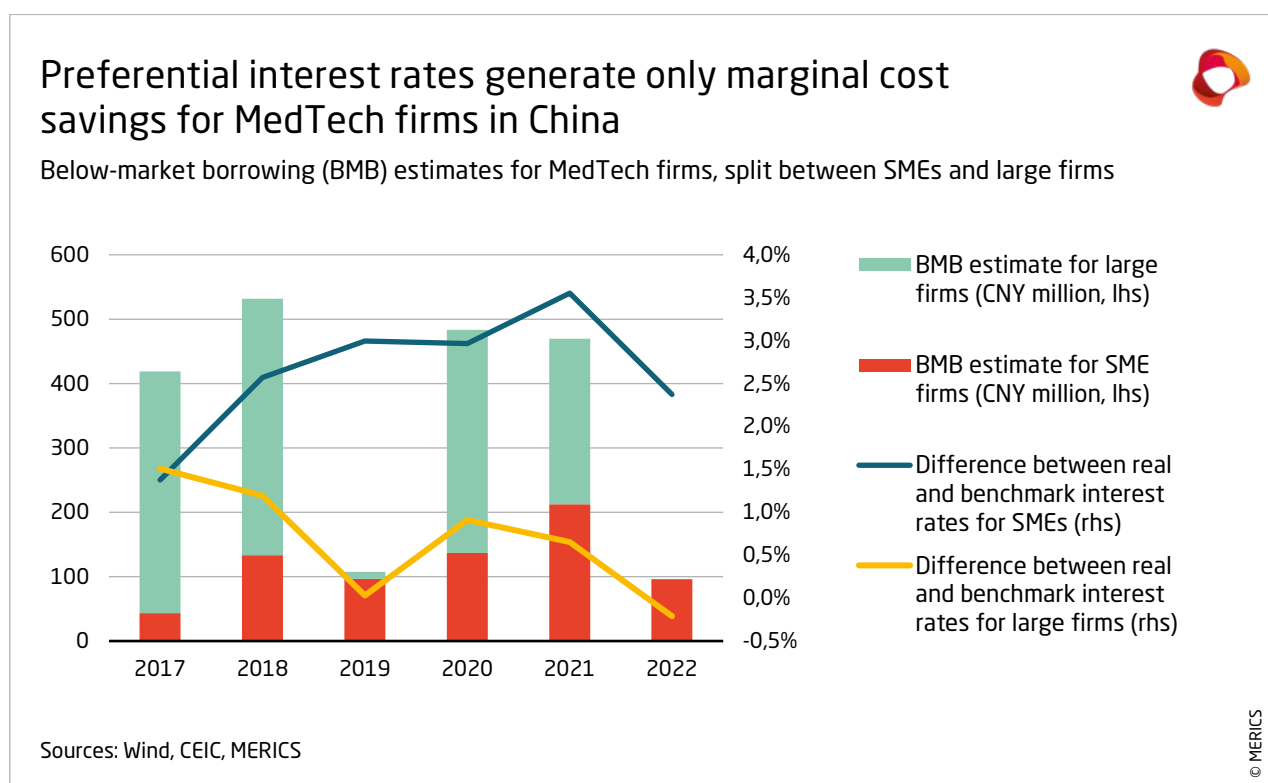
2.3.2 Below-market borrowing a minor factor for MedTech firms

State-run banks can offer companies preferential interest rates, i.e., below-market borrowing (BMB). This study emulates an OECD methodology to assess the extent of this form of state support. Corporate interest rates are calculated based on their financial records. The average interest rate for all firms is then compared to an estimated benchmark interest rate (based on an AA- credit rating for SMEs and an AA credit rating for large firms).⁴⁸

The results show that between 2017 and 2022, listed SMEs in the MedTech sector paid interest rates that were 2.6 percent lower on average than the benchmark AA- rate. Meanwhile, large listed firms paid interest rates that were 0.7 percent lower on average than the benchmark AA rate.⁴⁹ These reduced interest payments translate to below-market borrowing worth an average of EUR 45.9 million (CNY 350 million) each year for the 122 MedTech firms, which is equivalent to 0.22 percent of revenue.

These figures for below-market borrowing are much smaller than those produced by the OECD, which found below-market loans equaled roughly 2.3 percent of revenue for firms in China.⁵⁰ Yet these values are likely to vary considerably depending on the industry. Among the 122 MedTech firms in our sample, interest-bearing liabilities accounted for only about 30 percent of revenue in any given year. As these firms have a relatively low debt burden, a small variation in the interest rate granted them does not generate a significant financial boost.

Exhibit 17



2.4 Cultivation of MedTech Little Giant companies

China’s efforts to spur on the growth of high-tech SMEs are delivering significant resources to smaller firms in the MedTech sector. As seen in the analysis on direct subsidies and R&D tax deductions, such policies are of great importance to early-stage high-tech SMEs, providing additional capital as they scale up. State support has a bigger impact because of their smaller size. These firms are playing a key role in advancing the industry’s localization and have clear ambitions to compete in the global market.

Examples of Little Giant firms in the MedTech sector include:

- **Endovastec**, a producer of stent grafts. It developed China’s first indigenous-made abdominal aortic stent graft, and its aortic products have 28 percent of the domestic market. Its aortic stent graft and delivery system ("Castor branched stent") was listed in the sixth batch of "Manufacturing Champion Products" in 2021.⁵¹ Endovastec spent EUR 70 million (CNY 533 million) on R&D operations between 2017 and 2022.
- **Sinomed** is another Little Giant firm active in the coronary stent market. It produces balloon catheters, coronary stents, and other related products. Sinomed had one of the highest levels of R&D expenditure among Little Giant firms in our sample, spending EUR 128 million (CNY 977 million) between 2017-2022. Sinomed has subsidiaries in Beijing, Suzhou, Hong Kong, the United States, Japan, the Netherlands and France. It has set out its global ambitions, saying it is committed to enhancing the influence of *Made in China* in the international arena.

- **Cofoe Medical Technology** produces medical equipment for pregnant women, newborns, and home medical equipment. Its key products include blood glucose meters and blood pressure monitors. Cofoe’s annual reports mention the drive toward import substitution as a catalyst for the industry.⁵² Cofoe already exports to more than 46 countries.
- **iRay Technology** produces digital X-ray detectors with applications in fields like medical, dental and radiotherapy. It is also one of the leading R&D investors among the 39 Little Giants in this study’s sample, spending EUR 90 million (CNY 685 million) between 2017-2022. iRay has production facilities in Taicang and Haining, China, and in Seoul, South Korea. Its detectors are used in over 80 countries, including the United States and several European countries.

2.5 National S&T funding directed toward MedTech firms

This section attempts to estimate the value of China’s research funding in the MedTech field. According to the National Bureau of Statistics (NBS), China invested EUR 437 billion (CNY 3.09 trillion) on R&D in 2022 across all areas. That was a year-on-year increase of 10 percent and 19 percent more than Europe spent on R&D in 2021. China has not yet published the breakdown for 2022, but in 2021 companies spent 76.9 percent, government 13.3 percent and higher education institutes 7.8 percent. Due to a lack of transparency, only a portion of the roughly EUR 56 billion (CNY 400 billion) that the government spent in 2022 can be traced to specific sectors and technologies.

We estimate that about 10 percent of government R&D spending, or EUR 5.6 billion was spent on medical technology, based on the relative importance of medical technology across China’s main types of project-based research funding (see below). Estimates based on OECD data indicate that government spending on R&D in the field of medical and health sciences in 2021 was equivalent to EUR 5.7 billion in the United States, EUR 1.7 billion in Germany and EUR 1.2 billion in Japan.⁵³

We were not able to discern how much of this funding went to companies. When beneficiaries are mentioned at all, only principal investigators are named, many of them affiliated with universities, laboratories or hospitals (see exhibit 18). However, companies are often part of joint funding applications so they are, at the very least, among the main indirect beneficiaries.

Project-based research funding is organized into three pillars: the S&T Megaprojects, the National Key R&D Program (NKP) and the Natural Science Foundation of China (NSFC).

The national S&T Megaprojects are China’s flagship research projects. Medical technologies are included in two out of the 16 projects, or 12.5 percent, although these primarily focus on pharmaceuticals. For the 2020-2035 period, 15 megaprojects were set in 2016, and “next-generation artificial intelligence” was added in 2017. The list includes a megaproject on “healthcare” that seems primarily to support the Healthy China 2030 agenda, as it targets precision medicine, non-communicable diseases, reproductive health and birth defects, among other things. Unfortunately, China has not published how much

funding is involved, nor who gets it. Researchers at Wuhan University of Science and Technology reported winning a EUR 2.1 million (CNY 15 million) grant in 2022 under the “brain and brain-inspired science” megaproject, for research on Alzheimer’s disease.⁵⁴ In the 2006-2020 period, a megaproject on “major new drugs” was estimated to have received EUR 6.4 billion (CNY 55 billion) over the entire funding period. Because the S&T Megaprojects typically tackle major socioeconomic challenges, they often involve central SOEs and national champions, such as China Mobile and Huawei which took part in the “Next-generation mobile internet” megaproject that ended in 2020.

Exhibit 18: China’s leading medical technology research groups, according to public research funding records

TOP 10 NKP WINNERS BY PROJECT COUNT		TOP 10 NSFC WINNERS BY PROJECT COUNT	
INSTITUTION	PROJECTS WON	INSTITUTION	PROJECTS WON
Zhejiang University	17	Shanghai Jiaotong University	511
People’s Liberation Army General Hospital	16	Peking University	289
Shanghai Jiaotong University	15	Sichuan University	276
Sun Yat-sen University	13	Zhejiang University	275
Peking University Third Hospital	13	Huazhong University of Science and Technology	267
Beijing Tiantan Hospital of Capital Medical University	12	Fudan University	254
University of Science and Technology of China	11	Capital Medical University	246
Peking University	11	Sun Yat-sen University	244
Fu Wai Hospital, Chinese Academy of Medical Sciences	11	Xi’an Jiaotong University	171
People’s Liberation Army Third Military Medical University	10	Central South University	142

The National Key R&D Program (NKP) focuses on research that is close to marketization. About 10 percent of the 5,261 projects awarded this type of funding had terminology in their project titles that we have linked to medical technology.⁵⁵ The dataset is based on an online portal from China’s Ministry of Science and Technology and covers the 2016-2021 period. The portal mentions the funding granted in the first three years (2016-2019). We

were thereby able to trace the funding for 460 out of the 546 projects that met the criteria. They averaged about EUR 2.1 million (CNY 15.8 million) per project, and EUR 942 million (CNY 7.19 billion) in total. Extrapolating this to the entire set gives a total of EUR 1.12 billion (CNY 8.61 billion) over a five-year period, or EUR 224 million a year on average.

The NSFC supports basic and early-stage research. About 21 percent of the 518,354 projects that the foundation funded met the same criteria for medical technology that we used for the NKP. The dataset is based on official announcements and covers a much longer period, from 1994 to 2023, though its data for the last three years is less complete. The dataset is also a hundred times larger than that of the NKPs because it covers regional branches. Nevertheless, the total funding for the 108,369 projects that met the criteria was only EUR 700 million (CNY 5.93 billion), or EUR 63,800 (CNY 542,000) per project on average. Funding increased dramatically in 2011 and hovered around EUR 65-91 million (CNY 500-700 million) per year between 2012 and 2020.

Combining these datasets enabled us to extrapolate and estimate how much the Chinese state invests in medical technology R&D. If we take the lower limit of 10 percent of projects dedicated to medical technology (it is 12.5 percent for healthcare megaprojects, 10 percent for MedTech NKP and 21 percent for MedTech NSFC) and then assume that this 10 percent of projects also represents 10 percent of government R&D expenditure, that translates to EUR 5.6 billion of the total EUR 56 billion that was spent in 2022. A major caveat is that this approach assumes a stable relation between projects and funding, though we know that funding amounts vary substantively. The estimation can be improved through a more granular data analysis.

3. THE POSITION OF CHINESE FIRMS IN THIRD MARKETS

The estimates for state support presented in Chapter 2 demonstrate that China's MedTech firms benefit from substantial financial assistance, more than in other advanced economies. On top of this, non-financial measures such as the discriminatory application of regulations and procurement programs provide key advantages. These strengthen the position of China's MedTech firms in their home market and enable them to compete more effectively abroad.

While China's domestic market presents the strongest growth potential in the short term, third markets are likely to emerge as the main arena of competition between Chinese and foreign medical technology firms in the future, as is currently taking place in the battery and EV sectors. This chapter investigates recent trends in the international MedTech products trade. It then explores the outlook for MedTech products made in China and in the global market.⁵⁶

3.1 Reviewing China's position in the international MedTech trade

3.1.1 China has become a key player alongside the EU and the United States

China's role in international trade in MedTech products has grown tremendously over the past two decades. Around 2000, China partook in less than 3 percent of global trade in MedTech products in terms of value. By 2021, China accounted for 12.4 percent of exports and 8 percent of imports. This amounts to almost EUR 34 billion in exports annually (USD 40 billion), and EUR 21 billion in imports (USD 25 billion). In 20 percent of the customs lines covering MedTech products, China supplies more than 30 percent of global exports. For two categories – Mechano-therapy apparatus and non-mechanically propelled wheelchairs – China's share is more than two-thirds.

Since 2000, China's rise in global MedTech exports appears to have come primarily at the expense of US exports (possible explanations for this trend are given in section 3.2.2). The United States has seen its share of global exports steadily decline. In subcategories where China's share has increased significantly, the drop in US export share has been prominent. While the EU's share of global exports has been impacted in selected product categories, its overall share of global MedTech exports has remained steady (see exhibit 19).

The same can be said of other significant players. The combined share of world exports for Japan, South Korea, Japan, Malaysia, and Mexico has stayed broadly stable over the last decade. Altogether, those countries make up about 17 percent of global MedTech exports. Apart from Japan in diagnostic imaging and Mexico in other medical devices, none act as a production base for exports on the same level as the EU, United States or China. Only syringes, needles and catheters display a slight correlation between an uptick in Chinese-made exports and a break in the trend for one of these countries, namely Mexico.

Exhibit 19

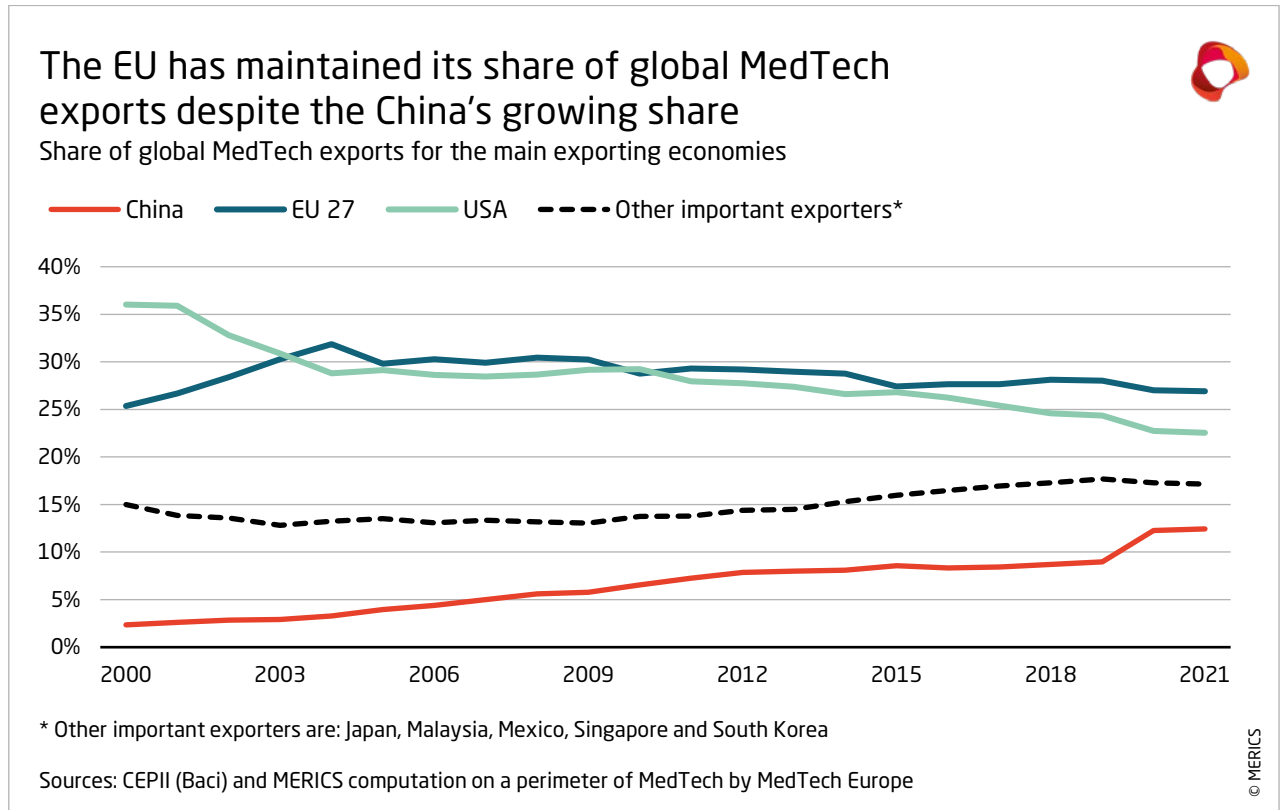
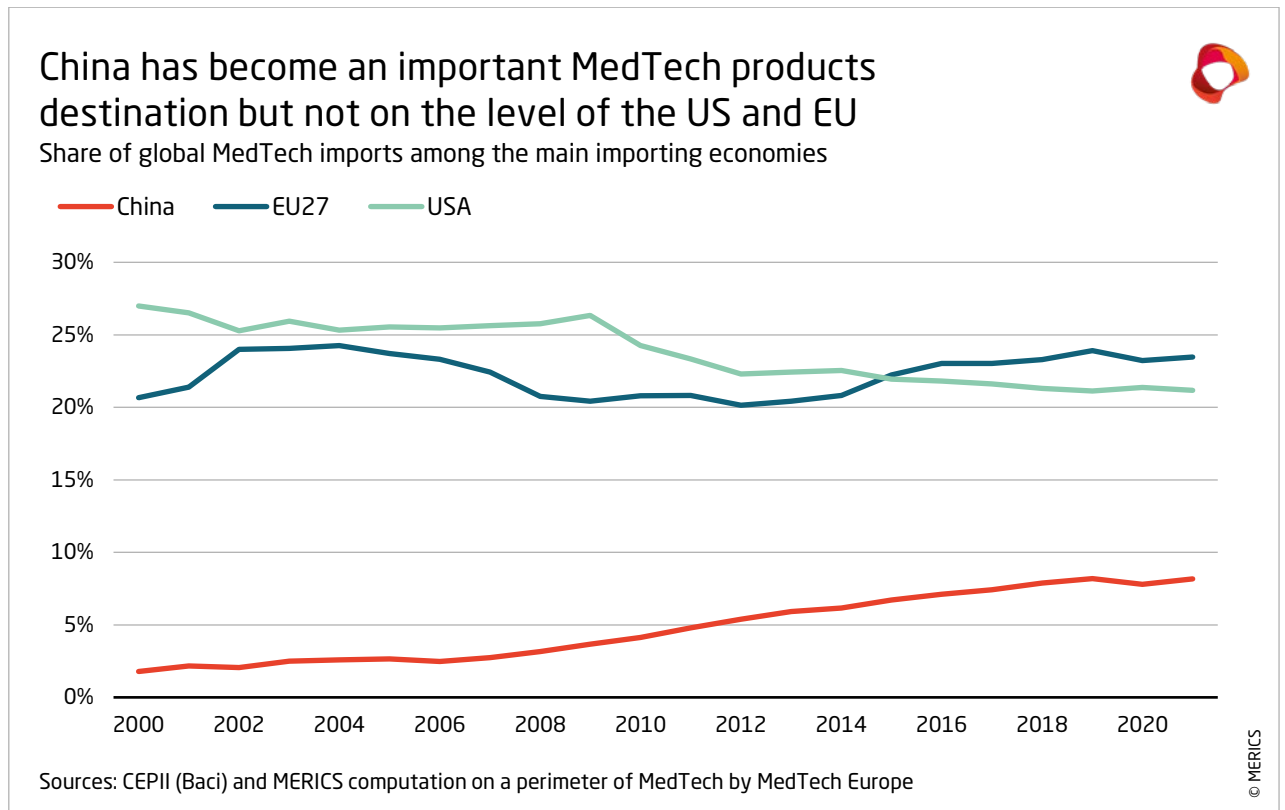


Exhibit 20



A review of MedTech exports by product category shows China's share has already or is on track to surpass the United States and is approaching the EU's share in many areas, like medical consumables, patient aids and dental products. China now accounts for about 20 percent of global exports in each of these product categories (see exhibits 21, 22 and 23).

On a more granular level, there seems to have been a crowding-out effect on EU export growth in some products due to the rise of Chinese-made products, such as catheters and syringes (see exhibits 24 and 25). In other areas, the growth in Chinese exports has been rather moderate, as with diagnostic imaging (up from 1 percent of world exports in 2000 to 11 percent in 2021) and orthopedics and prosthetics (up from 1 to 4 percent). These are segments where the United States and EU still account for more than half of global exports.

Exhibit 21

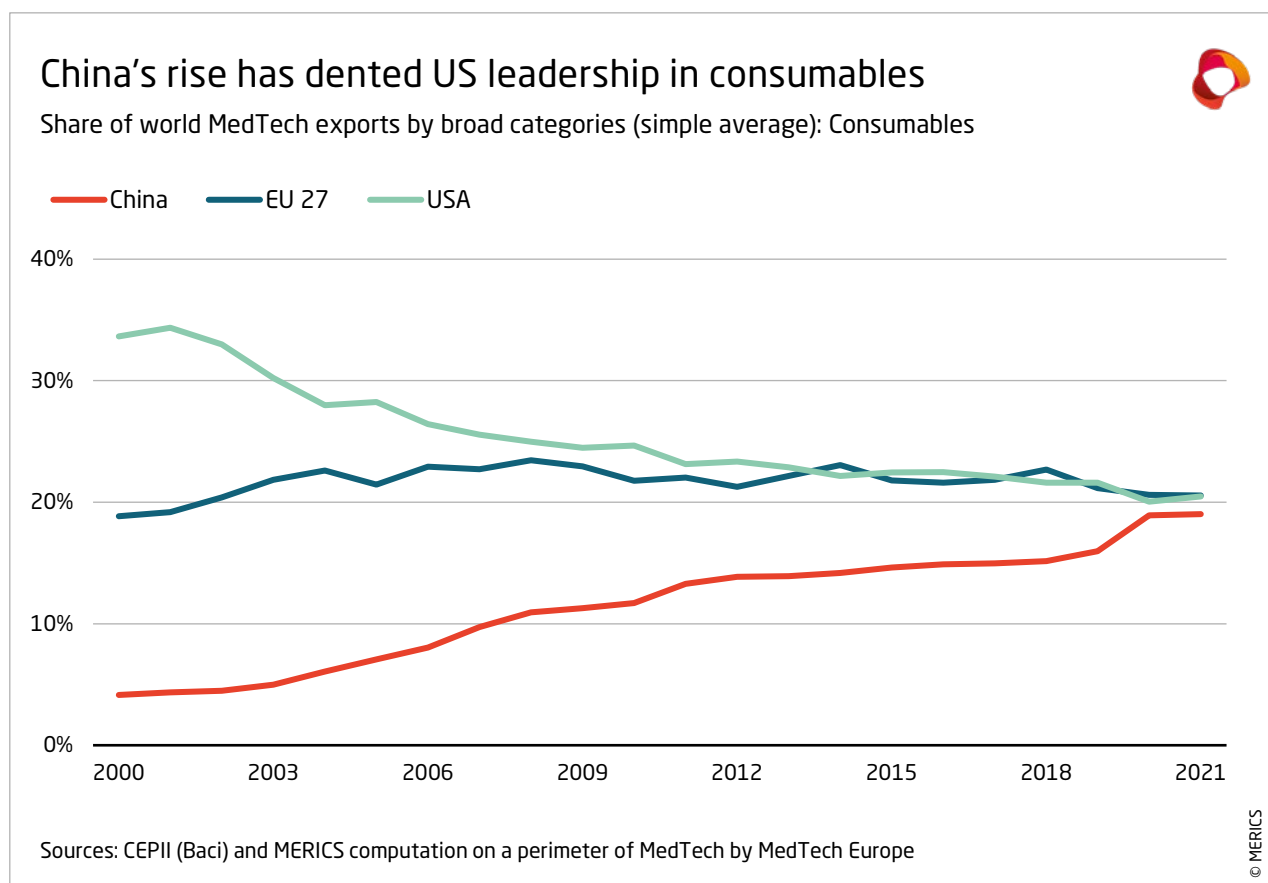


Exhibit 22

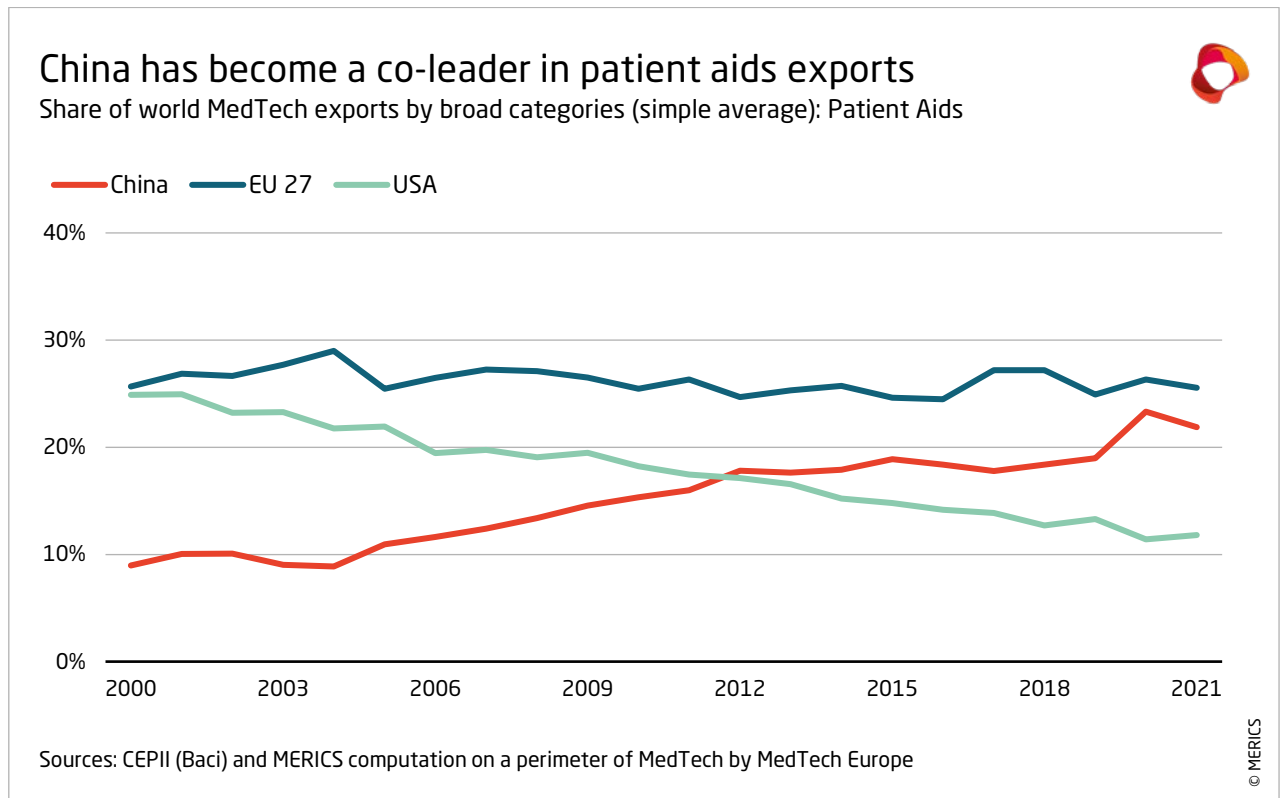


Exhibit 23

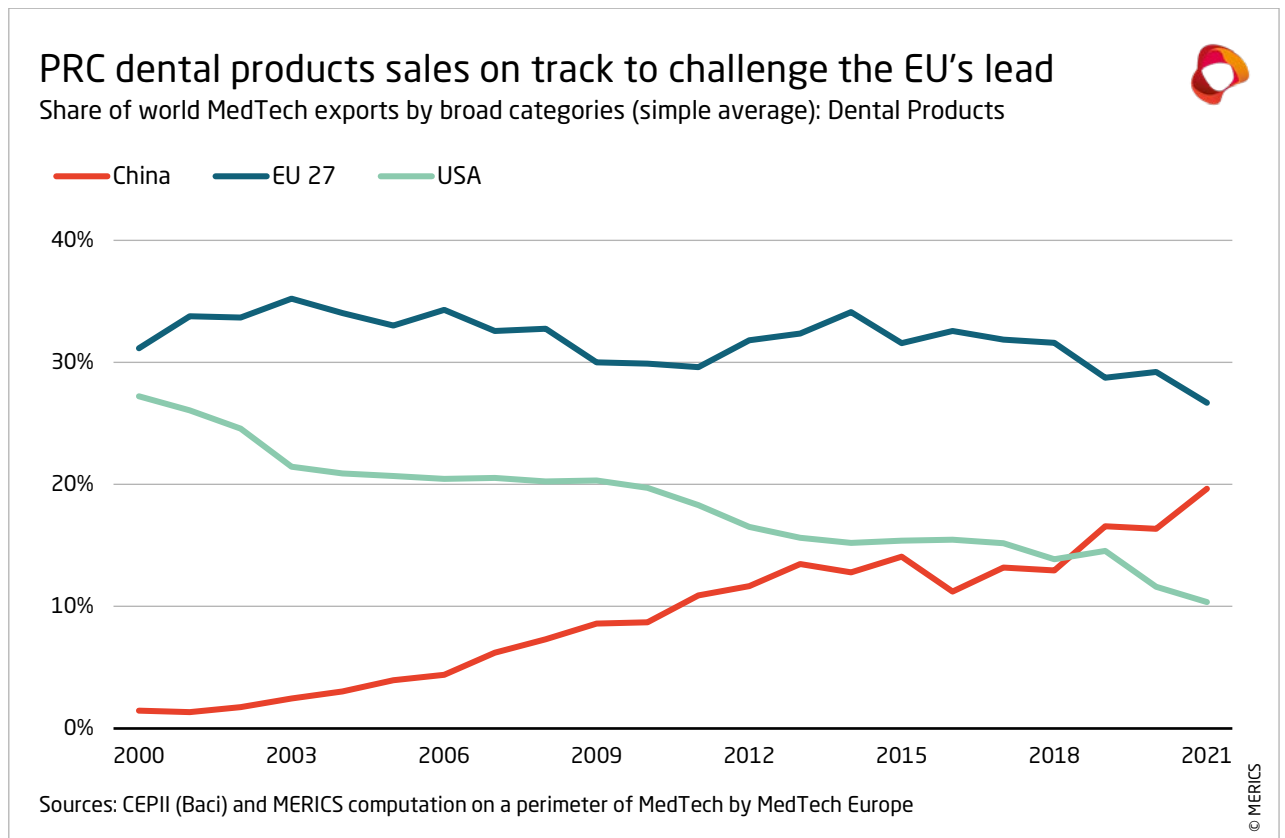


Exhibit 24

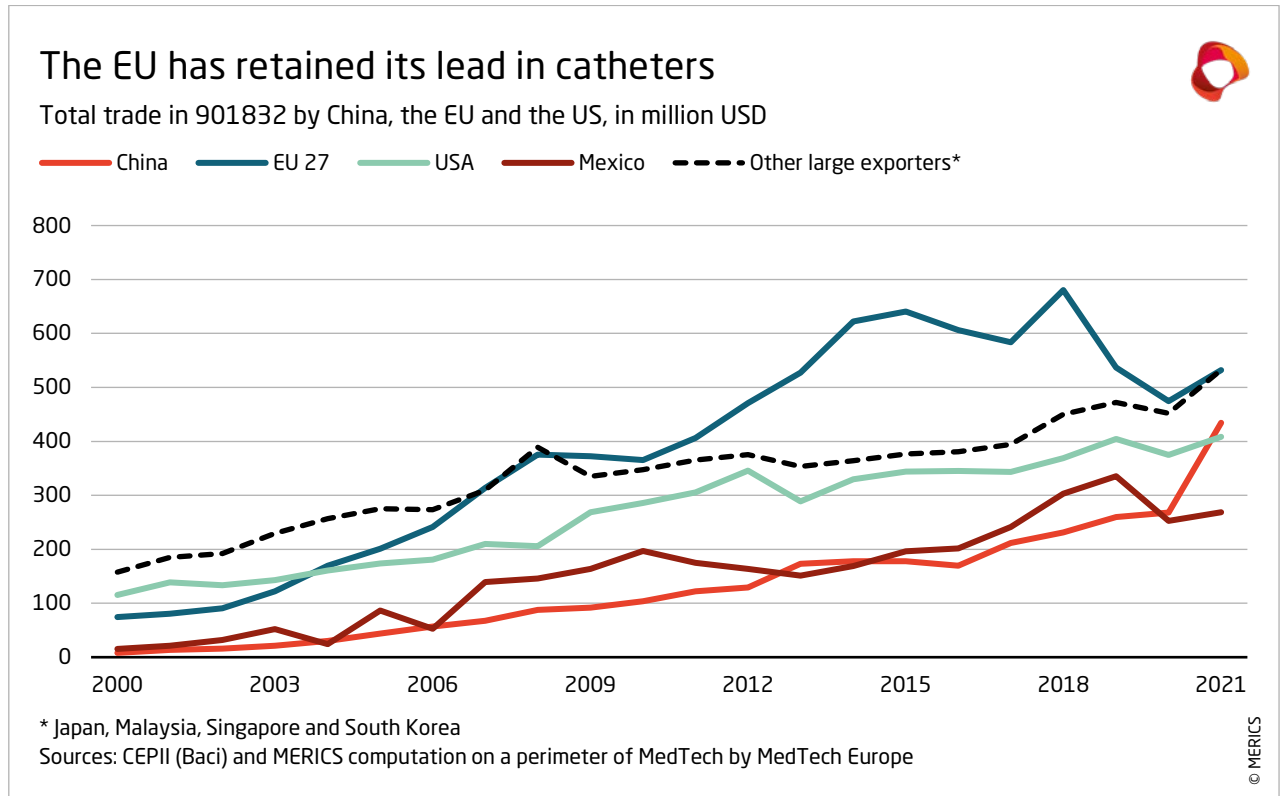
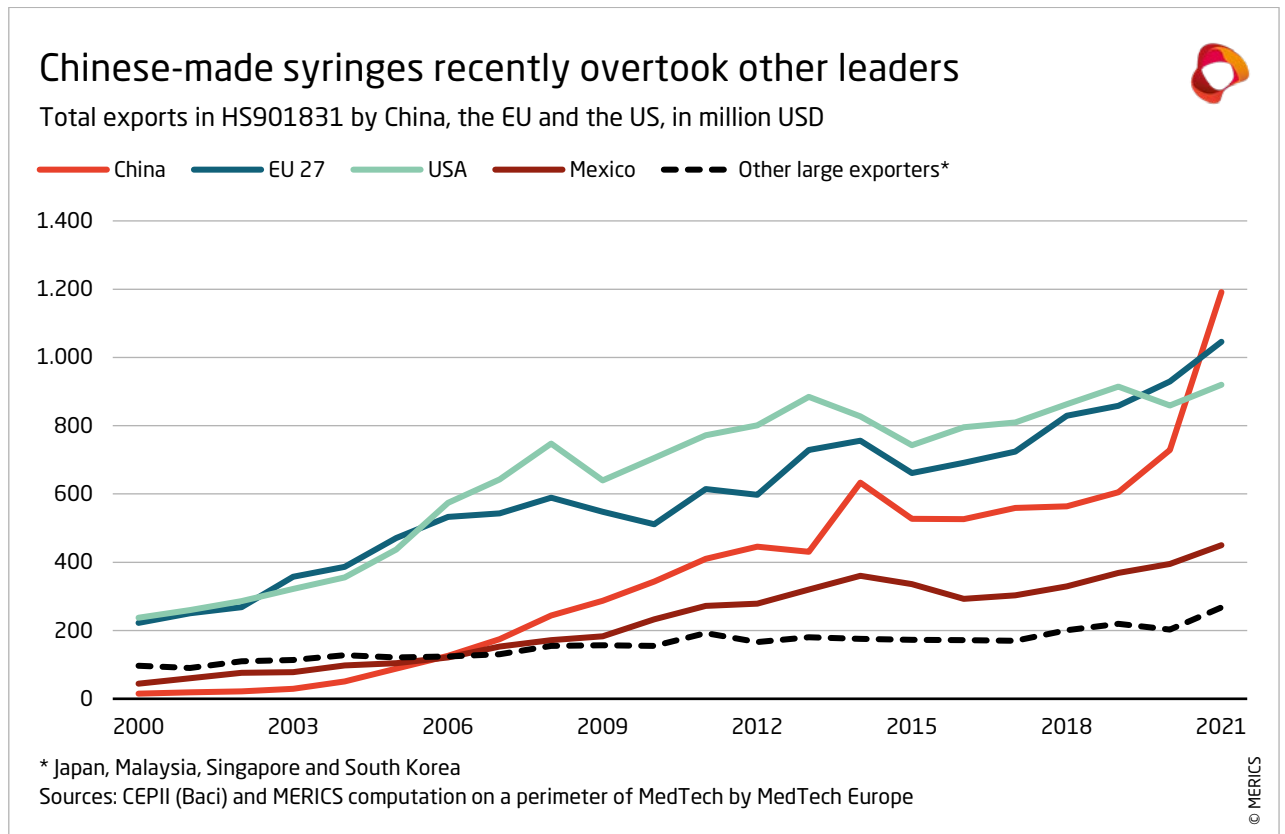


Exhibit 25



Broadly speaking, the main products that make up China's MedTech trade have changed little over the past two decades. There remains a clear difference in the kinds of products traded by China on the one hand, and the EU and the United States on the other. China's exports are more concentrated on lower-end products; therapeutic appliances, bandages and dressing products still make up 30 percent of all Chinese MedTech exports. The EU and the US exports are more diversified, with a greater weight on high-end products, such as laboratory reagents, catheters, or artificial joints.

That is not to say that nothing has changed. In China's export mix, the diminishing importance of bandages and dressing products, from 19 percent in 2000 to 6 percent in 2021, and the slightly increased diversification toward more complex products – such as electrodiagnostic apparatus – is noteworthy. This is unsurprising as it tracks the overall path of China's economy, which has grown in complexity and capacity since the beginning of the century.

China's import figures suggest that domestic demand for more high-end MedTech products has grown, as have local production capacities in other products. This is reflected in growing imports of more advanced surgical instruments (which made up 27 percent of China's MedTech imports in 2021) and a drop in imports of portable aids. Meanwhile, the share of imaging machinery and radiation apparatus decreased from 34 percent to 15 percent of Chinese MedTech imports from 2000 to 2021, likely because of increased domestic production capacities (partly driven by foreign firms localizing their production).⁵⁷

3.1.2 China's export advances are most evident in emerging economies

All countries around the globe have witnessed significant growth in the inflow of Chinese MedTech products. Yet the uptick has been most prominent in low-income countries, whose imports from China are mostly in basic products (i.e., more price-sensitive and high-volume products).⁵⁸ For instance, between 2017-2021, China's exports of bandages and dressings to low and lower-middle income countries were more than double those of the EU and the United States combined.

China has also increased its exports to middle- and high-income countries, but the importance of the EU and the United States as suppliers of MedTech products is greater. In middle-income countries, China is not visibly challenging EU or US exports as yet, except for imaging parts and accessories.

Exhibit 26

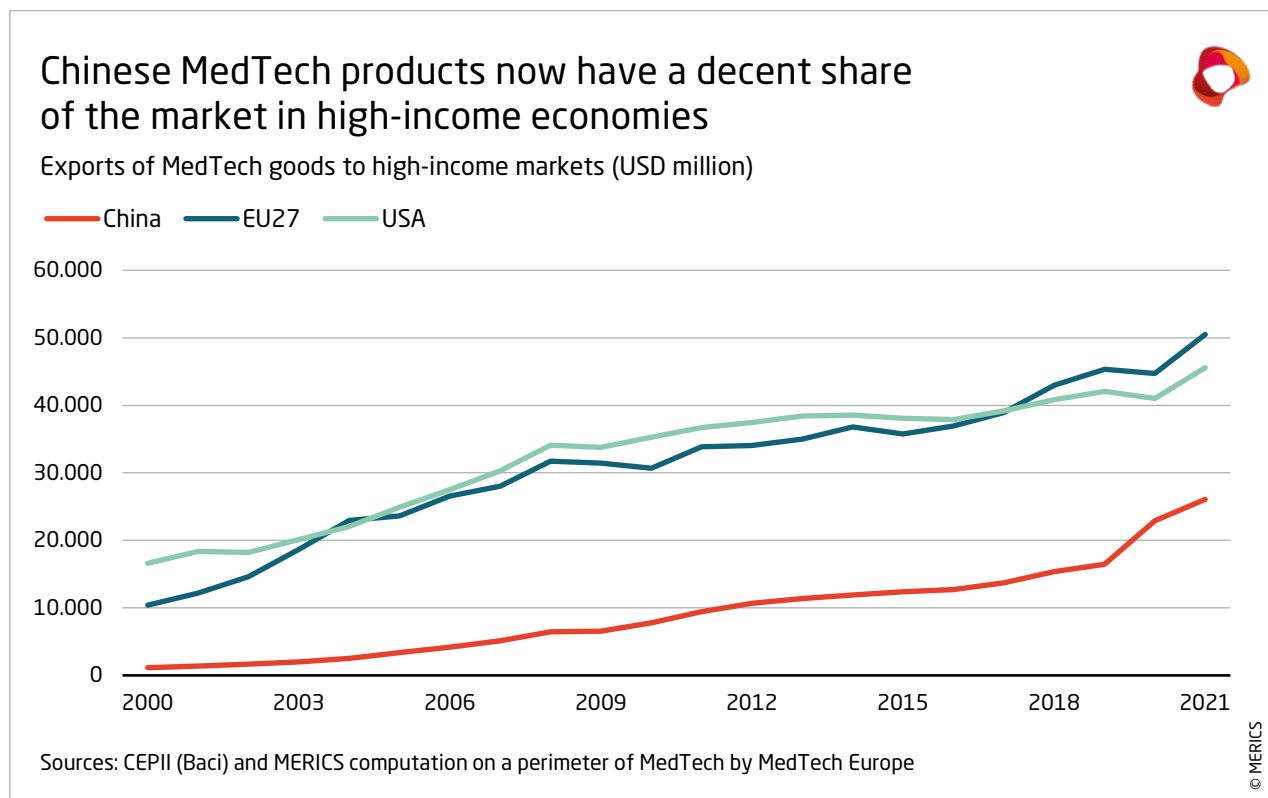


Exhibit 27

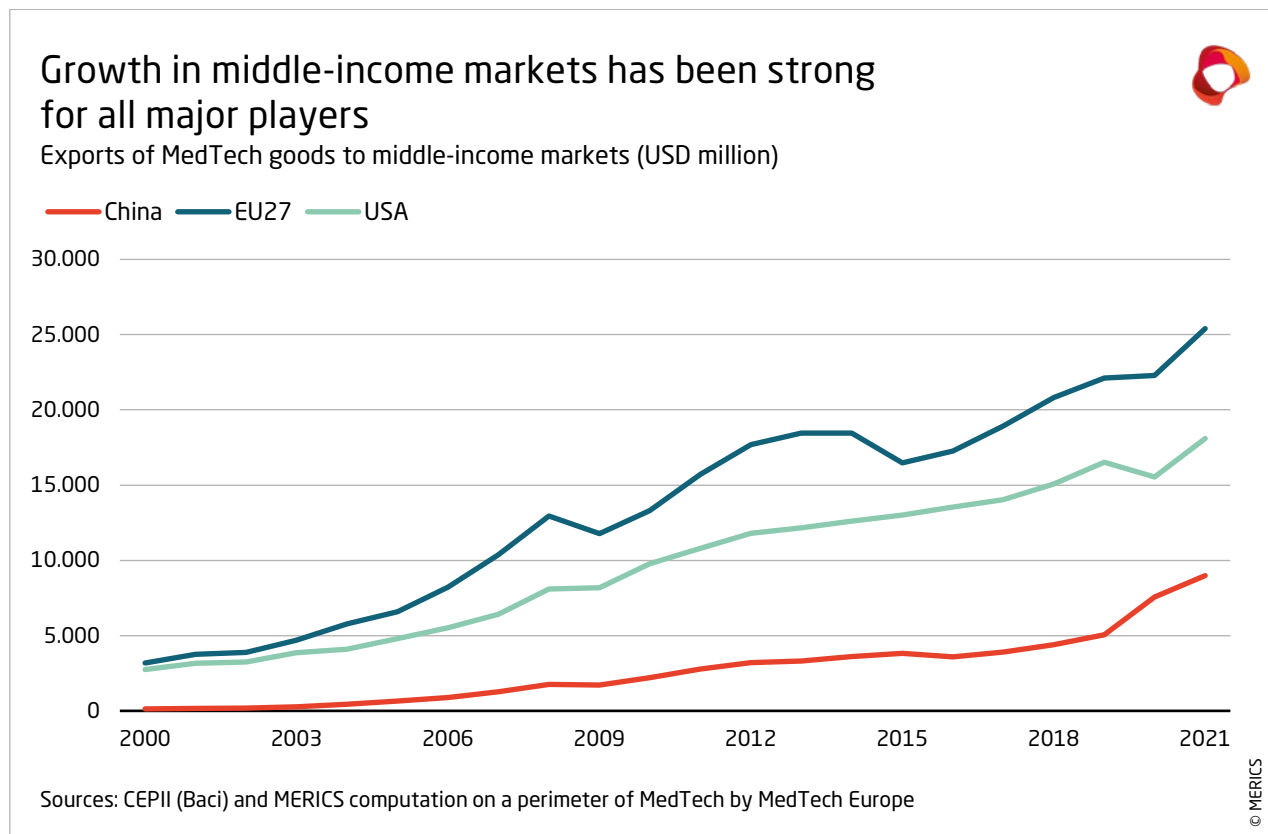
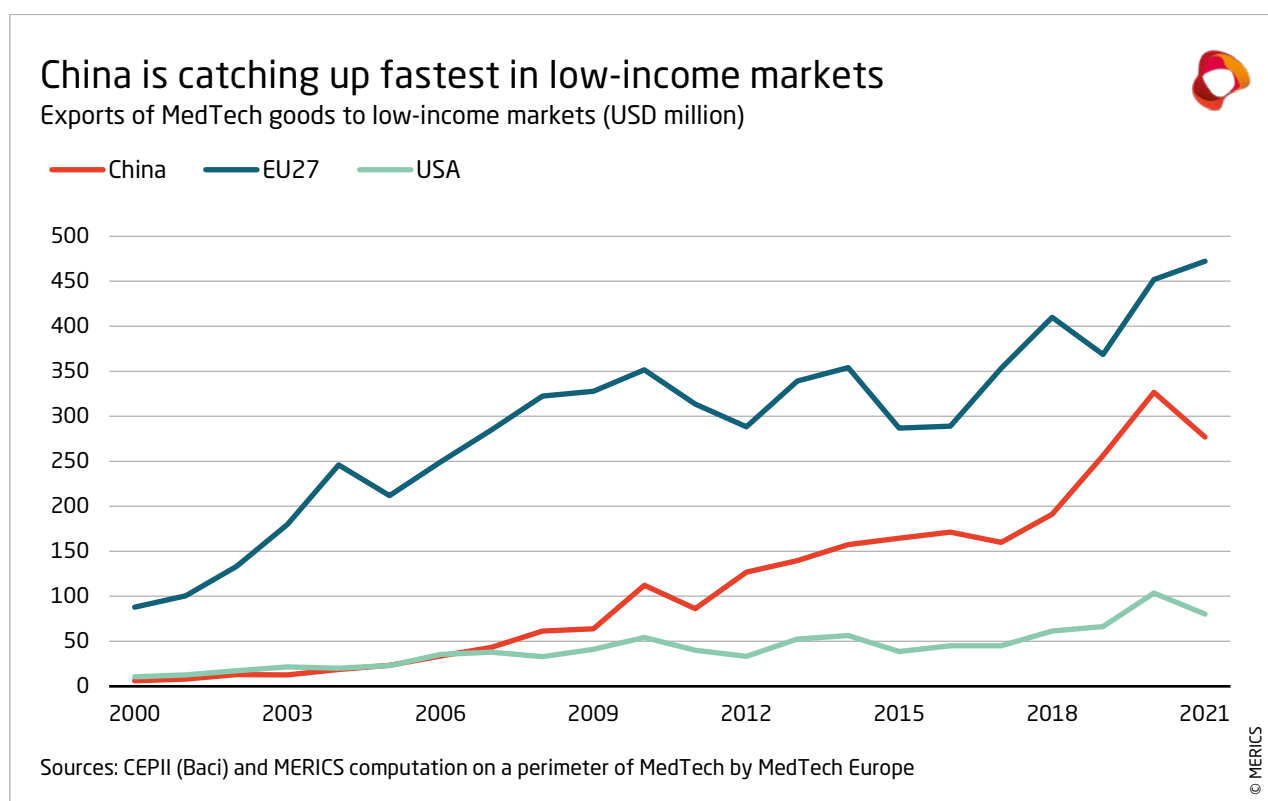


Exhibit 28



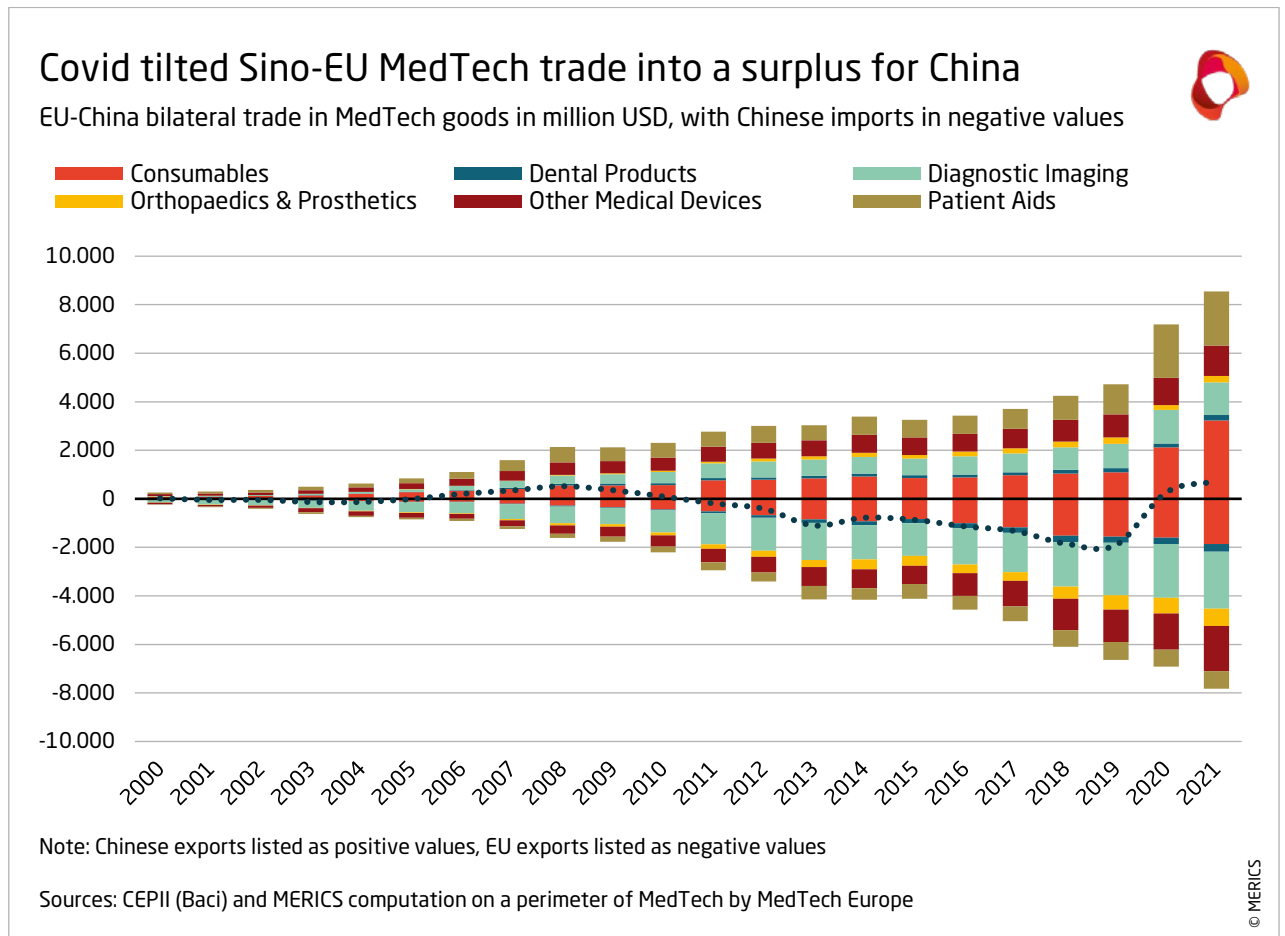
Looking at the geographic distribution of export competition, China is well positioned in Africa, where Chinese MedTech exports are one third of EU exports and twice the level of US exports. Two decades ago, China's exports to Africa were only about 10 percent that of the EU or the United States. Turning to south and southeast Asia, China's MedTech exports are nearing the level of EU exports in India and have overtaken those of the EU and United States in Indonesia and the Philippines.

There is no specific pattern of increases in Chinese exports to Belt and Road Initiative (BRI) partner countries, despite advances in some emerging markets. Even looking at subgroups of BRI countries, be it by region (Africa, Asia, etc.) or by income level (low-/middle-/high- income countries), there is no clear trend of stronger Chinese exports above the level visible elsewhere.

3.1.3 Bilateral EU-China trade in MedTech products

Trade in MedTech products between the EU and China delivered a substantial surplus for the EU, up till the beginning of the Covid-19 pandemic in 2020. Bilateral trade relations started off balanced in the 2000s, then evolved into a surplus for the EU during the 2010s. From 2015 to 2019, the bilateral surplus for the EU averaged EUR 1.3 billion (USD 1.5 billion) a year.

Exhibit 29



A recent surge in Chinese MedTech exports to the EU has reversed the trade balance, yielding a deficit of EUR 600 billion (USD 725 billion) in 2021. Almost all that rise was due to an increase in exports of oxygen products (for 2020 only), reagents and mechano-therapy appliances. During the Covid-19 pandemic, EU MedTech imports from China almost doubled. The rapid shift was a stark departure from pre-pandemic trends.

In contrast, the expansion of EU MedTech exports to China began in 2017/18 and embraces numerous product types (see exhibit 29). This could imply that EU export growth will remain high beyond the pandemic period. The share of EU MedTech exports going to China has grown progressively, reaching 10 percent or EUR 7 billion (USD 8 billion) in 2021, up from about EUR 2.5 billion in 2011 (USD 3 billion), thanks mostly to surgical instruments.

China has been a strong growth market for EU exports, with an average annual increase of close to 19 percent over the past two decades. Some standouts include X-ray materials (tubes and films) and ophthalmic instruments. China now accounts for over 20 percent of the EU's exports of these products, compared to almost nothing two decades ago.

3.2 The outlook for MedTech competition in third markets

China's growing competitiveness in the MedTech sector is felt most sharply within its own domestic market. However, the same factors making that competition difficult – from the legitimate strength and innovativeness of China's scientists, engineers and entrepreneurs, to extensive state aid and the distortions it can bring – are and will be projected into third market competition.

3.2.1 China's playbook for internationalization

The move from domestic domination to global competitiveness is a well-worn road for China's national champions. The combination of joint venture (JV) requirements for foreign investors, the suite of state aid directed to indigenous firms, and especially procurement and market access issues (first as a means of support, then as a means of protection) have helped China's companies transform themselves into world leaders in the rail, shipping, and 5G sectors.⁵⁹

Protectionism, procurement, and state aid help China's rail champions go global

China's domestic rail industry has been dominated by SOEs for freight and non-high-speed passenger trains. These firms have long enjoyed a protected home market and extensive state aid. Having mastered traditional rail technologies and built an economy of scale to become globally competitive, China's rail industry set its sights on high-speed rail (HSR).⁶⁰

China opened up to foreign investment in local production of HSR suppliers. Investors were required to enter into JVs with local firms. However, given the abundance of competitive players in the market, foreign firms such as Bombardier, Siemens, Kawasaki and Alstom accepted local partners in order to secure contracts supplying Beijing's ambition for a massive national HSR grid.

Over time, the JV tech transfers helped local partners catch up technologically until indigenous suppliers had developed 'good enough' HSR technology.⁶¹ Once that level was reached, procurement greatly favored indigenous suppliers and the extensive state aid provided to those (mostly state-run) firms in a protected home market generated massive economies of scale.

Now, China's HSR industry is a global one. With additional state support from the Belt and Road Initiative creating additional demand for both HSR and traditional rail, China's rail footprint overseas has displaced many competitors and taken significant market share.

3.2.2 Can China's MedTech players displace foreign firms in third markets?

The plentiful state aid and protection outlined in this report are all likely to boost the competitiveness of China's MedTech players in third markets moving forward.

How are they doing so far?

As outlined in section 3.1.1, China's MedTech exports have not yet meaningfully displaced EU exports at the aggregate level. By contrast, US MedTech companies seem to have lost significant ground to Chinese competitors. A thorough evaluation of the reasons behind this trend goes beyond the scope of this report, but possible explanations for the greater impact on US exports could include:

- First, there may be more direct competition between US and Chinese firms because of higher levels of product overlap. They may be more likely to sell similar products, or to sell a given product within the same value category, so China's entrance into that segment could have displaced US exports.
- Second, it may be that US MedTech firms have offshored more production to China, including for exports, so the outcome is higher Chinese exports and lower US ones.
- Third, US firms may have offshored more than EU firms into third markets, meaning their sales in those countries are not reflected in US trade data.
- Fourth, EU strengths like brand reputation as well as standards (like CE) may have helped EU MedTech firms to increase sales in third markets in ways that US and Chinese manufacturers are unable to replicate.

However, while EU exports have remained resilient overall, certain segments have seen higher than average displacement by exports from China. In 2021, China's exports of catheters overtook the US level and were approaching the EU's level, while China's exports of syringes overtook both the EU and the United States. China is challenging the leadership of both major rivals in X-ray technology exports to middle-income markets. More broadly, it is closing the gap with the EU on exports to Africa, South Asia and Southeast Asia.

Such trends could be driven partly by traditional competitive advantage, but the abundant state aid received by Chinese firms in their home market ought not be overlooked. The multitude of preferential policy measures, including procurement and financial support, enables Chinese firms to develop economies of scale that can be projected into third markets.⁶² This has resulted in a growing capacity to compete with European firms in the budget and mid-value ranges for certain MedTech equipment. European competitors are likely to feel increased pressure in high-end markets too as China's MedTech producers continue to climb the value chain, in line with the aims embodied in its national industrial policy.

How might they do in the future?

Although China's MedTech sector enjoys similar advantages to its rail, shipping, and 5G industries, there are also some distinct differences. The MedTech sector is considerably

more fragmented, with multiple players in firms of all sizes, than the far more concentrated industries where China Inc has gone global in the past. Larger Chinese MedTech firms such as Mindray and United Imaging are already pushing competition in overseas markets and will continue to do so. Meanwhile, SMEs that are still building up capacity within China may have less assertive internationalization plans – though some of the most advanced and fast growing under schemes like the Little Giants initiative are going abroad earlier.

Just how effective the Little Giants initiative is in promoting MedTech firms will be an important factor in the internationalization of China's home-grown firms. In the past, China's industrial policy has prioritized more consolidated industries. The struggles of advanced SMEs in China have been noted for many years, but this has begun to change. To the degree that the Little Giants succeed, European MedTech companies can expect greater direct competition in many fields where Europe's own hidden champions have long reigned. Firms such as Endovastec, Sinomed and iRay Technology are developing local alternatives to imported products and looking to expand overseas (see Chapter 2 for details).

More broadly, how Beijing manages different priorities in the healthcare sector, and to what degree it seeks to stimulate or constrain domestic competition, will have a considerable impact on how China's MedTech firms do overseas. When Chinese firms that already enjoy a protected home market project themselves overseas, they can benefit not only from state aid, but also from cannibalizing their home market to gain market share overseas – i.e., if dominant in a given technology in a market devoid of competition, they can raise domestic margins to lower overseas ones and thereby offer lower prices abroad to secure market share.

However, the opposite scenario is also possible. China's government finances could face considerable strains from debt and economic growth issues combined with the rising burden of society's healthcare costs. If so, Beijing may then decide that securing lower prices for a given MedTech product domestically is more important to strategic goals than gaining global market share. The potential for such a scenario is more acute in MedTech than many other sectors due to the growing use of volume-based procurement, which hands single suppliers a huge share of the domestic market if they win bids, but at the cost of a massive cut to margins.⁶³

That could put pressure on affected firms to raise margins overseas to compensate for lost margins at home, which in turn would limit their ability to undercut pricing when facing off with foreign competitors. Similar pressure is already pushing some of China's consumer internet and e-commerce players to look overseas for markets and margins to compensate for weaker opportunities at home after a series of crackdowns on their sector between 2020-2022.⁶⁴ As a result, if Chinese MedTech firms are pushed to find profitability overseas, that may be a catalyst for them to enter third markets and compete with European players there. However, because those Chinese firms would be looking abroad to replace lost margins in China, they would be less able to slash margins overseas, which would make competition with them fairer.

As such, speculating on future third market competition remains a mixed bag in a highly segmented and very diverse industry. There will likely be a wide range of archetypes of Chinese competitors in third markets. Some will cannibalize their protected home market and leverage state aid to the fullest when they go abroad and apply cutthroat tactics to compete for market share, while others will struggle to expand globally as their shareholders demand high margins overseas to compensate for Beijing's strangling of margins, and with many other options in between.

ANNEX

Annex 1: Products covered by each segment in the state support analysis

SEGMENT	PRODUCTS
Medical devices	Dental cements, Medical X-ray film (flat), Medical X-ray film (rolled), Medical, surgical sterilizers, Wheelchairs, not mechanically propelled, Wheelchairs, mechanically propelled, Electrocardiographs, Ultrasound, MRI, Scintigraphic apparatus, Other electrodiagnostic apparatus, Ultra-violet or infra-red ray apparatus, Dental drills, Dental instruments, Ophthalmic instruments, Blood pressure monitors, Endoscopy apparatus, Dialysis apparatus, Transfusion apparatus, Anesthetic apparatus & instruments, Mechano-therapy apparatus, Therapeutic respiration apparatus, Fixation Devices, Artificial teeth, Other dental fittings, Artificial joints, Other artificial body parts, Hearing aids, Pacemakers, Other portable aids, CT scanners, Dental X-ray, Other medical X-ray apparatus, A, B, C ray apparatus, X-ray tubes, Other imaging parts & accessories, Dental chairs, Hospital furniture, Contact lenses, Artificial joints, Orthopedic or fracture appliances, Other artificial body parts, Compound optical microscopes other than stereoscopic or those for microphotography, microcinematography or microprojection, Mineralized collagen artificial bone repair products used in orthopedics, oral or plastic surgery, and neurosurgery, Aortic balloon dilation catheters, Aortic stent grafts, Biological hard brain (ridge) membrane patch, Artificial crystal, Titanium skull fixing / repair products, Spinal implant, Artificial dural (spinal) membrane patch, Biofilm, oral repair membrane, Blood glucose meter
IVD	Blood-grouping reagents, Prepared culture media for development or maintenance of micro-organisms (including viruses and the like) or of plant, human or animal cells, Diagnostic or laboratory reagents on a backing and prepared diagnostic or laboratory reagents, whether or not on a backing, other than those of heading 3002 or 3006, Life science plastic equipment (cell culture plates, cell culture bottles, vacuum and needle filters, disposable serum pipettes, centrifuge tubes), Biological diagnosis Reagent, Urine tests, Reproductive health detection reagent, enterovirus detection reagent, blood infectious diseases diagnostics reagent, Coagulation tests systems, Gene sequencing technology for clinical applications
Medical consumables	Medical dressings (adhesive), Medical dressings (non-adhesive), Suturing Materials, First-aid boxes & kits, Ostomy products, Surgical gloves, Syringes (with/without needles), Tubular metal needles/needles for sutures, Other needles, catheters, cannulae, etc

Annex 2: HS codes included in the trade data analysis

AREAS (CATEGORY 1)	CATEGORY (CATEGORY 2)	SUBCATEGORY	HS6 CODE (CATEGORY 3)
Consumables	Bandages & Dressings	Medical dressings (adhesive)	300510
Consumables	Bandages & Dressings	Medical dressings (non-adhesive)	300590
Consumables	Suturing Materials	Suturing Materials	300610
Consumables	Other Consumables	Blood-grouping reagents	300620
Consumables	Other Consumables	First-aid boxes & kits	300650
Consumables	Other Consumables	Ostomy products	300691
Consumables	Other Consumables	Surgical gloves	401511
Consumables	Syringes, Needles & Catheters	Syringes (with/without needles)	901831
Consumables	Syringes, Needles & Catheters	Tubular metal needles/needles for sutures	901832
Consumables	Syringes, Needles & Catheters	Other needles, catheters, cannulae, etc	901839
Consumables	Other Consumables	Prepared culture media for development or maintenance of micro-organisms (including viruses and the like) or of plant, human or animal cells	382100
Consumables	Other Consumables	Diagnostic or laboratory reagents on a backing and prepared diagnostic or laboratory reagents, whether or not on a backing, other than those of heading 3002 or 3006	382200
Dental Products	Instruments & Supplies	Dental cements	300640

Dental Products	Capital Equipment	Dental drills	901841
Dental Products	Instruments & Supplies	Dental instruments	901849
Dental Products	Instruments & Supplies	Artificial teeth	902121
Dental Products	Instruments & Supplies	Other dental fittings	902129
Dental Products	Capital Equipment	Dental X-ray	902213
Dental Products	Capital Equipment	Dental chairs	940210
Diagnostic Imaging	Imaging Parts & Accessories	Contrast media	300630
Diagnostic Imaging	Imaging Parts & Accessories	Medical X-ray film (flat)	370110
Diagnostic Imaging	Imaging Parts & Accessories	Medical X-ray film (rolled)	370210
Diagnostic Imaging	Electrodiagnostic Apparatus	Electrocardiographs	901811
Diagnostic Imaging	Electrodiagnostic Apparatus	Ultrasound	901812
Diagnostic Imaging	Electrodiagnostic Apparatus	MRI	901813
Diagnostic Imaging	Electrodiagnostic Apparatus	Scintigraphic apparatus	901814
Diagnostic Imaging	Electrodiagnostic Apparatus	Other electrodiagnostic apparatus	901819
Diagnostic Imaging	Radiation Apparatus	CT scanners	902212
Diagnostic Imaging	Radiation Apparatus	Other medical X-ray apparatus	902214
Diagnostic Imaging	Radiation Apparatus	A, B, C ray apparatus	902221
Diagnostic Imaging	Imaging Parts & Accessories	X-ray tubes	902230
Diagnostic Imaging	Imaging Parts & Accessories	Other imaging parts & accessories	902290

Orthopedics & Prosthetics	Fixation Devices	Fixation Devices	902110
Orthopedics & Prosthetics	Artificial Joints	Artificial joints	902131
Orthopedics & Prosthetics	Other Artificial Body Parts	Other artificial body parts	902139
Orthopedics & Prosthetics	Artificial Joints	Artificial joints	902111
Orthopedics & Prosthetics	Artificial Joints	Orthopedic or fracture appliances	902119
Orthopedics & Prosthetics	Artificial Joints	Other artificial body parts	902130
Other Medical Devices	Medical, Surgical Sterilizers	Medical, surgical sterilizers	841920
Other Medical Devices	Wheelchairs	Wheelchairs, not mechanically propelled	871310
Other Medical Devices	Wheelchairs	Wheelchairs, mechanically propelled	871390
Other Medical Devices	Ultra-Violet Or Infra-Red Ray Apparatus	Ultra-violet or infra-red ray apparatus	901820
Other Medical Devices	Ophthalmic Instruments	Ophthalmic instruments	901850
Other Medical Devices	Other Instruments & Appliances	Blood pressure monitors, endoscopy apparatus, dialysis apparatus, transfusion apparatus, anesthetic apparatus & instruments	901890
Other Medical Devices	Hospital Furniture	Hospital furniture	940290
Other Medical Devices	Ophthalmic Instruments	Contact lenses	900130
Other Medical Devices	Ophthalmic Instruments	Compound optical microscopes other than stereoscopic or those for microphotography, microcinematography or microprojection	901180
Patient Aids	Therapeutic Appliances	Mechano-therapy apparatus	901910

Patient Aids	Therapeutic Appliances	Therapeutic respiration apparatus	901920
Patient Aids	Portable Aids	Hearing aids	902140
Patient Aids	Portable Aids	Pacemakers	902150
Patient Aids	Portable Aids	Other portable aids	902190

ENDNOTES

- ¹ Witmed, “China’s Medical Device Market Is the Second Largest in the World at 958.2 Billion! 中国医械市场全球第二，规模 9582 亿！”，May 4, 2023, <http://www.cn-witmed.com/list/13/6215.html>.
- ² Tax benefits include tax deductions for R&D activities and preferential tax rates for high-tech firms. Below-market borrowing refers to loans provided with discounted interest rates. Below-market equity refers to additional equity contributions made to firms through state actors or government guidance. Due to the opaque nature of this form of state support, we provide a lower (more conservative) and upper (more realistic) estimate of its potential extent.
- ³ The other important exporters are Japan, Malaysia, Mexico, Singapore and South Korea.
- ⁴ Witmed, “China’s Medical Device Market Is the Second Largest in the World at 958.2 Billion! 中国医械市场全球第二，规模 9582 亿！”，May 4, 2023, <http://www.cn-witmed.com/list/13/6215.html>;
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- ⁷ Shenzhen Development and Reform Commission, “Notice of the Shenzhen Municipal Development and Reform Commission on the Issuance of Three Policy Measures Including ‘Several Measures of Shenzhen to Promote the High-Quality Development of Biomedical Industry Clusters’ 深圳市发展和改革委员会关于印发《深圳市促进生物医药产业集群高质量发展的若干措施》等三个政策措施的通知,” January 1, 2023, http://www.sz.gov.cn/zfgb/2023/gb1273/content/post_10403843.html.
- ⁸ Rebecca Arcesati, Alexander Brown, and Gregor Sebastian, “MERICS China Industries: Data Market + Foreign Talent + Bio-Based Materials,” February 1, 2023, <https://www.merics.org/de/merics-briefs/data-market-foreign-talent-bio-based-materials>.
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- ³² Gerard DiPippo et al., “Red Ink: Estimating Chinese Industrial Policy Spending in Comparative Perspective” (CSIS, May 23, 2022), <https://www.csis.org/analysis/red-ink-estimating-chinese-industrial-policy-spending-comparative-perspective>.
- ³³ See annex for the list of products included under each segment.
- ³⁴ According to China’s “SME Classification Standards”, industrial firms with less than 1000 employees or annual revenue of EUR 56.5 million (CNY 400 million) qualify as an SME. The Little Giant subset includes the data of firms both before and after their nomination as Little Giants. The SME subset only includes the data of firms in years when they meet the SME classification standards.
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Forms of state support as a share of revenue are recorded as follows: For China, government grants 0.65 percent, tax concessions 0.75 percent, below-market borrowing 2.3 percent, below-market equity 0.75 percent; for OECD countries, government grants 0.06 percent, tax concessions 0.32 percent, below-market borrowing 0.05 percent, below-market equity 0.25 percent.
The benchmark figures for below-market equity (BME) are indicative. The value of 0.75 percent of revenue is assumed given that the average value of BME derived by firms in OECD countries is approximately 0.25 percent.
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- Since not all firms record this data in their annual reports and it is not retrievable via the financial data platforms, the ratio of R&D expenses (which is retrievable) to R&D tax deductions is calculated for 12 firms across 2017 to 2022. This ratio, together with reported R&D expenses, is then used to estimate R&D based tax deductions for the remaining 122 companies. The ratio varies between 7 percent and 13 percent between 2017 and 2022. This is to be expected given that the corporate income tax rate applied to most listed MedTech firms is 15 percent, and the super deduction applies to certain forms of R&D expenditure, but not all.
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- ⁴⁶ Considering a relatively wide spread of PE ratio values is normal, this approach provides an estimate for which PE ratio values are unusually high and could be a marker of government intervention in equity markets. Outliers above 100 were excluded from the calculation of the standard deviation for foreign firm PE ratios.
- ⁴⁷ This approach is supported by the fact that PE ratios of companies listed on stock markets in East Asia are in general lower than companies listed in the US or Europe. More established stock exchanges lend greater security and higher valuations to stocks. See: Reuters, “Asian Stocks’ Relative Valuations to Global Peers at 14-Month Low,” September 13, 2021, <https://www.reuters.com/business/asian-stocks-relative-valuations-global-peers-14-month-low-2021-09-13/>.
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