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China as leading innovator, and as challenger to US hegemony ?

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ABSTRACT: To what extent has China over the past decade leapfrogged beyond 'factory of the world' (scaling up technologies developed elsewhere) to 'leading innovator' (starting up technologies developed at home to produce new-to-the-world products)? To what extent has China's size, economic development and geopolitical influence reached the point where it is challenging the US for hegemony ? The essay gives a qualified 'yes' to the first question, a qualified 'no' to the second.

KEYWORDS: catch up, innovator, hegemony, techno-nationalism

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For all the talk of 'the decline of the West' and 'the rise of the global South, especially East Asia', the world economy remains structured into two big average income tiers or blocs. Indeed, the two-tier structure has strengthened over the past several decades. The three regions of Latin America and the Caribbean, Middle East and Central Asia, and Sub-Saharan Africa have *lower* average incomes relative to the US in 2023 than more than 40 years earlier in 1980 (measured at purchasing power parity).

- Latin America's and the Caribbean's average income fell from 38% in 1980 to 25% of the US's by 2023;
- Middle East and Central Asia's fell from 39% to 19%;
- Sub-saharan Africa's fell from 10% to 6%.
- Emerging and developing Asia without China rose slightly after 1980 to reach almost 15% by 2023;

China was the big exception:

- China rose from slightly above 2% in 1980 to almost 29% of the US by 2023;

Of all sizable countries South Korea has had the most impressive catch up:

- South Korea's GDP per capita relative to the US's rose from 17% in 1980 to almost 70% in 2023 (UNCTAD 2024, fig. III.2).

This income structure is fundamentally satisfactory for the US and the wider West. The bloc of western states plus Japan has a strong interest in protecting the international capitalist economic system which keeps it on top, protecting its power to 'make' the rules that others 'take'. Its constituent states and publics have a built-in incentive (implicitly) to justify their superior position in line with what could be called a 'law' of modern-era power hierarchies: elites legitimize their success in terms of universalistic and meritocratic qualities, like initiative, hard work, commitment to the scientific method, and

legitimize others' lower rank in terms of their failure to match these qualities, their excessive dedication to identity politics, corruption, leisure (and white populations have long used the non-universalistic criterion of skin colour to claim superiority) . In Max Weber's words from 1915:

'The fortunate man is seldom satisfied with the fact of being fortunate.... He needs to know that he has a right to his good fortune. *He wants to be convinced that he "deserves" it...in comparison with others .... [G]ood fortune, thus wants to be legitimate fortune'* (emphasis added).

Within this two tier structure, globalization has become more win-lose, relations between states are now more sharp-elbowed. In the words of the Munich Security Report 2024, 'as more and more states define their success relative to others, a vicious cycle of relative-gains thinking, prosperity losses, and growing geopolitical tensions threatens to unroll. The resulting *lose-lose dynamics* are already unfolding in many policy fields and

engulfing various regions' (Bunde et al. 2024, emphasis added).

Major states are operating as 'techno-nationalists', qualifying the earlier embrace of neoliberal globalization. They are trying to reduce their vulnerability to other states' 'weaponizing' control of global supply chains. They urge their producers to relocate strategic production in line with 'friend-shoring' or 'near-shoring' or 'on-shoring'.

China, with the second biggest population after India's, at 1.4 bn, holds the world record for the longest period of continuous GDP growth above 6% per year – by far. Its real GDP growth was 8% around 2000, 14% in 2007, then steadily down to under 5% by 2024 (some estimates suggest much lower, about 2%).[1] It now has the second biggest nominal GDP after the US, having leapfrogged Japan, India and Germany. In the past decade

[1] Xiang Songzuo calculated the growth rate at 1.7% in 2018, against the official figure of 6.6%. Nikkei Asia 2019

it has become the US's chief rival nuclear-armed superpower.

It has long been claimed in the US's governing class – and extra loudly in the Trump government -- that mistakes in US trade policy opened the opportunity for China to become the US's chief rival. The US allowed China to become an economic superpower by permitting it to join the WTO in 2001 as a developing country enjoying 'special and differential treatment' in international trade; then opening to a flood of Chinese unfairly subsidized manufactured imports, which knocked out swathes of US manufacturing and employment (the 'China shock'), causing deep divisions in US politics -- now coming home to roost in the two Trump governments. This is the argument that led the first Trump government to impose significant tariffs on imports from China, the Biden government to maintain some, raise others, and impose export controls, and the second Trump government to raise the tariffs still further and on many more countries (Ganesh 2025).

Robert Atkinson, president of the US-based Information Technology and Innovation Foundation (ITIF), spells out the argument: 'Lawmakers need to understand that for China, a desire to make money … is secondary. Its primary goal is to *damage America's economy and pave the way for China to become the world's pre-eminent power.* Countries like China are power traders, called such because their policies and programs are designed not only to advance their power but also to degrade their adversaries, even at a financial cost to their own economies' (2025, emphasis added).

Atkinson's implication is that the US, with 4% of the world population and around 25% of global nominal GDP (16% in PPP terms), *should* continue to command the world economy and somehow check the rise of a nation that includes 17% of humankind, accounts for 18% of global nominal GDP, has an average nominal income of only about 16% of the US's, and a median age significantly

older than the US's (40.2 years compared to the US's 38.3 years). The argument reflects a colonial mindset, in which the colonizer denies agency to the colonized.

This essay answers two main questions. First, to what extent has China over the past decade leapfrogged beyond 'factory of the world' (scaling up technologies developed elsewhere), to 'leading innovator' (starting up technologies developed at home to produce new-to-the-world products)?

Second, has China's size, economic development and political influence reached the point where it is challenging the US for hegemony ? The second question is more difficult to answer than the first ! All the more so in the second Trump government (starting in 2025), when, in the words of Jeffrey Engel, head of the Center for Presidential History at Southern Methodist University, 'It's not just a reversal of previous administration policies ... but *a reversal of the fundamentals of American foreign*

policy since 1945' (Broadwater 2025, emphasis added). The US in the second Trump government seems to be pulling out of multilateral relationships and denigrating allies, while still insisting it is the greatest of nations and still has more power than any other to set the global rules.

Meanwhile, President Xi held a meeting with senior Communist Party officials in April 2020 and laid out his vision for winning in a confrontation with the US over the trade imbalance. Chinese leaders must 'tighten international production chains' dependence on our country forming a powerful capacity to counter and deter foreign parties from artificially disrupting supplies' to China, he said in his speech to the Central Financial and Economic Affairs Commission. Far from China complying with US wishes for it to open more to US companies and US imports, and stop subsidizing selected advanced sectors, this is a statement of defiance of US pressure.

China's catch up

The long-established story says the US does better than anyone else at start-ups, going from 0 to 1, inventing and innovating; while China does better than anyone else at scale-ups, going from 1 to 100; hence, ‘the factory of the world’.

Indeed, over the past decade Chinese firms have moved far along from 1 towards 100, as seen in significant gains in global market share in many advanced industries, including telecommunications equipment, machine tools, computers, solar panels, high-speed rail, ships, drones, satellites, heavy equipment, pharmaceuticals, rare earth magnets.

Chinese firms and foreign firms operating in China have copied technologies developed elsewhere, produced at giant scale for domestic and export markets, and applied *kaizen*, the Japanese concept of ‘continuous improvement’ – the concept that once struck awe into US

corporate hearts and which Chinese producers seem to have mastered. Across electric cars (EVs), consumer electronics, industrial machinery, high speed trains, and robots, but also in more traditional manufacturing, *kaizen* principles are propelling relentless incremental quality and productivity advances, bringing prosperity to broad reaches of the society (Lewis 2025).

China increased its share of world manufacturing from 9% in 2004 to 30% in 2023. This is almost twice the US share at 16%, and more than the US, Japan, Germany, South Korea, and Britain combined. No country has dominated global manufacturing on this scale since the US in the aftermath of World War Two.

Exporting

The country has not run a trade deficit since 1993 (more than 30 years). Exports rose 13% in 2023 and another 17% in 2024.

The growth model depends on export demand, which has created millions of jobs and almost doubled the average inflation-adjusted wages of factory workers in the past decade, and more for high-earning engineers, designers, scientists (Bradsher 2025b).

State-controlled banks are lending record amounts to industrial borrowers, new factories are being built on the edges of most cities, and existing factories are investing heavily in robots and automation. China has 495 industrial robots per 10,000 employees (2023), third highest after South Korea and Singapore and ahead of Germany and Japan. The US, with 295, ranks 11th. In 2023 China installed more industrial robots than all other nations combined.

Factory capacity is two to three times beyond domestic demand. Katherine Tai, the US Trade Representative in the Biden government, said, "The

tsunami is coming for everyone", threatening to close factories and lay off workers around the world and especially in America and Europe.

China has become a dominant exporter in over 600 products, which makes it the biggest exporter of six times more types of products than either the US or Japan.

For decades, Volkswagen's complex at Wolfsburg, German was the largest car factory in the world. BYD, the leading Chinese electric vehicle maker, is building two complexes in China each capable of producing *twice* as much as Wolfsburg. China's exports of EVs in the first half of 2025 were 65% higher than the same period in 2024.

A recent study finds that, in the 25 years between 1995 and 2020 , almost all the increase in global sales of 11 *advanced* industries to countries outside the OECD was imported from China. In other words, China has hugely boosted exports from its advanced industries to the

global South in the past quarter century, while importing much less (Atkinson 2024).

The trade surplus was almost $1 trillion in 2024, the biggest inflation-adjusted trade surplus ever recorded for any country in the past century. Japan's trade surplus peaked in 1993 at less than a fifth of China's 2024 surplus. Germany's peaked in 2017 in the wake of the Eurozone crisis at about a third of China's 2024 surplus (Bradsher 2025a).

Chinese leaders express anger at trade barriers raised to slow their export drive, while ignoring the steep disruption costs on citizens of importing countries.

Causes of catch up

China's investment as a share of GDP has long been at world record heights. For over two decades the figure

has been at 40% or higher. Only nine other countries have ever experienced investment above 40%, briefly (Sharma 2025a). China's investment share is roughly equal to its consumption share, around 40% of GDP – which is again highly unusual, in that almost all other economies have an investment share much lower than the consumption share. The standard story says that the state has supressed consumers to make way for more investment. But consumer spending has grown at more than 8% a year for the past two decades, far faster than in any other economy, which hardly suggests "suppression". Some Chinese economists outside government urge government to strengthen the meagre social safety net, such as by substantially raising health insurance and the government pension for seniors and rural dwellers.

The government rejects boosting domestic demand – even as the latest budget makes $100 bn available for ports and other infrastructure that helps exporters and upgrades manufacturing technology in 20 Chinese cities.

Extraordinarily high investment is combined with relatively cheap labor costs (today, 25-30% of US levels*)*. Domestic producers then leverage vertical integration and economies of scale with large helpings of western technologies. Insofar as there is a magic formula for Chinese industrial promotion, this is it.

The institutional underpinnings of fast rise up the industrial sophistication scale were created after the economy-opening of the 1980s as the Chinese state used its power to lead an approximation of the nearby Northeast Asian capitalist developmental states, Japan, South Korea and Taiwan. This combined a strong central planning component with a vibrant entrepreneurial culture, integrated with sector-selective promotion policies (Wade 2004, 2018).

- The state undertakes central *planning* but relies increasingly on market resource *allocation*. The

combination of central planning and market allocation has been a lot more effective than the Soviet and Mao combination of central planning and central allocation. Profit-seeking entrepreneurs and provincial and local governments are incentivized to investment more in some activities than in others in line with the national plan.

- The state operates through a public bureaucracy in the Weberian mode, with autonomy and coercive power to make policies and carry them out, but also institutionally embedded in the civil society and actively cooperating with the private corporate sector.[2]

[2] Non-state firms in China are commonly described as 'private'. This is misleading. The National Intelligence Law of 2017 obliges all firms to provide their data and facilities for the use of agencies working under this legal framework, such as the Ministry of State Security and the Military Intelligence Bureau. For convenience this essay continues to use 'private firms'.

- The financial system is subordinated to the production sector and publicly owned.

- FDI is regulated to leverage technology transfer from incoming (western and Japanese) firms to domestic firms, often via joint ventures.

- Being so much bigger than the other Northeast Asian developmental states, the Chinese state has operated with a clear distinction between three levels, each with different institutions and incentives. At the top, the upstream industries and natural monopolies, owned by the state and coordinated by the central government. Below that, at regional and city level, technologically dynamic sectors closely linked to (western, Japanese, Taiwanese) multinational corporations. Government units at this level take broad national policies and resources and tailor them to growth and innovation in their

jurisdiction, with scope to experiment. The bottom level is the myriad small and medium private companies in light industries, on the margins of state attention.

- Officials at regional and city level have scope to experiment even beyond the existing rules and regulations. If their experiments (eg in establishing new economic activities) bring net benefits to the party and economy, the rules and regulations may be changed to legitimize their experiments. The higher authorities judge the net benefits in terms of certain major objective metrics derived from the five-year plan guidelines (Dieges et al 2025) So the officials know their promotions are substantially determined by the extent to which they produce net benefits broadly aligned with the national development strategy, even if they break status quo rules and regulations.

- Particularly from the 2000s Japanese and Singapore officials and academics have interacted regularly with Chinese officials and academics.

China's leapfrog to technology leader

The second part of the 'factory of the world' story -- China is good at 1 to 100 but not at 0 to 1 -- is now out of date. China has become a rival innovator to the US as it reaches a new stage in its economic development, with much higher innovation capabilities in its domestic companies and universities than a decade ago, while retaining a big cost advantage from before. The Huawei conglomerate has recently opened a research center in Shanghai for 35,000 employees, mainly engineers, that has 10 times the space for offices and labs as Google's HQ in California.

Research by the Australian Strategic Policy Institute (ASPI) tracked 64 'critical' technologies spanning defence, space, energy, environment, AI, biotech, robotics, cyber, computing, advanced materials and key areas of quantum technology.

In 2003-2007 the US led in 60, China in 3. By 2019-2023 China led in 57, the US led in 7. 2016 was the major inflection point. The metric is citations of the top 10% of the most highly cited published papers in each field (ASPI 2024).

Research by the US-based Information Technology & Innovation Foundation (ITIF) finds that

"China has reached a new stage in its economic development, with much greater innovation capabilities in its universities and domestic companies – and *on many innovation indicators, China now leads the United States*" (emphasis added).

The ITIF finds that in 2020 , China had the biggest share of global production in 7 out of 10 advanced industries, the US led in the other 3. China's 7 included computers and electronics, chemicals, machinery & equipment, motor vehicles, basic metals, fabricated metals, and electrical equipment. The US's 3 included IT and information services, pharmaceuticals, and other transportation (Atkinson 2024).

DeepSeek and other breakthroughs

It is a striking 'coincidence' that on the day of President Trump's second inauguration, January 2025, when he boasted that 'America will soon be greater, stronger and far more exceptional than ever before', the Chinese AI start-up DeepSeek released its AI model R1. DeepSeek claims that

(1) the model reaches an equal or higher level of reasoning power than other AI models like OpenAI's,

(2) at less than one-fifth the cost of OpenAI's flagship project, and

(3) the core team of young mathematicians and scientists behind DeepSeek all attended university in China rather than abroad (Friedman 2025).

US technologists and intelligence agencies have declared DeepSeek to be 'AI's Sputnik moment', because till that moment it had been generally assumed that at least in AI, China was years behind the US frontier. The tech futurist and Trump supporter Marc Andreessen declared R1 'one of the most amazing and impressive breakthroughs I've ever seen' (Wallace-Wells 2025). Eric Schmidt, former chief executive and chairman of Google, reports that 'DeepSeek's March update to its V3 large language model is, by some benchmarks, the best non-reasoning model' in the world (Schmidt and Xu 2025).

The key to DeepSeek's breakthrough was the realization that the learning algorithm developed by the US tech firms is very inefficient, and therefore requires enormous amounts of power. DeepSeek concentrated on making the algorithm more efficient, needing much less power. Instead, it required high inputs from advanced mathematicians (Sunada 2025). In the PISA rankings of 80 countries by math skills of 15 year olds, China ranks number 2 after Singapore in 2024, US ranks around 50 (World Population Review 2024). (But students from the urban provinces of Beijing, Shanghai, Jiangsu, Zhejiang are the sole participants of PISA testing in China, unrepresenting most of the 37% of the population that is rural.)

However, most reports of DeepSeek's high performance come from English-speaking users. Chinese-speaking users report that, now it is fully connected to the domestic internet, its answers reflect strict political censorship (for example, answers to 'how many people died in China's three year famine?', 'is China's recent

economic data credible?'). DeepSeek's global usage share has reportedly dropped from over 7% to around 3% within a few months of release.

BYD is another example of Chinese innovation at the frontier. It began as a battery company and is now the world's fastest growing automaker, heavily investing in autonomous driving technology. Meanwhile, GM (General Motors) has closed its autonomous vehicle project (Cruise) and invested in buying back its own shares !

In robotics, the Beijing Half-Marathon in April 2025 included 12,000 human and 21 bipedal humanoid runners, 6 of whom completed the course. The humanoids are a product of the growing demand for robots that can assist in everyday life and specialized tasks as China's population shrinks and ages.

China's test of a nuclear-capable hypersonic missile, DF-27, in 2021, caused a 'Sputnik moment' in US military

circles, which had assumed China was years behind. It is claimed the missile travels at speeds exceeding 5,600 kilometers an hour (Mach 5), can reach from China to Hawaii and beyond, penetrate US missile defences, and poses a particular threat to US aircraft carriers – therefore limits US options for defending Taiwan (National Security Journal 2024).

Causes of leapfrogging to world frontier

Presiding over a vast area and population, with very large median income differences between different regions (especially east, center and west) , China's party-state has 'ridden two horses at once': it has implemented industrial policy to promote factory-of-the-world 'catch up' across many industries, emphasising guaranteeing low-cost supply of key inputs to give producers a cost advantage in export markets. At the same time it has created a national innovation system with mission-

oriented programs in advanced tech sectors to ‘leapfrog’ to or close to the world frontier (Dieges et al. 2025).

In terms of the crude metric, R&D spending as a percentage of GDP, China’s rose steadily from 1.7% in 2010 to 2.65% in 2024, which accounts for more than 27% of world spend on R&D. The US’s figure has been above 3% since 2019, 3.5% in 2024, or more than 32% of world spend on R&D (National Science Foundation 2024).

We see the result of ‘riding two horses at once’ in the composition of exports: China continues to have a high share of global labor-intensive exports, even as it has a dramatically rising share of mid- and high-tech global exports. Earlier, the much smaller Northeast Asian economies tended to offshore the labor-intensive operations of supply chains to Indochina and Southeast Asia as they increased production of higher value-added products at home. This was ‘the flying geese’ model of passing on industries or parts of industries to lower-cost

sites, from Japan to South Korea and Taiwan, then on to Thailand and Vietnam.

In contrast, Chinese production of labor-intensive products has tended to move from higher cost east to cheaper regions within China, rather than falling in share of national production as high tech exports rise – exacerbating pressures on the rest of the world (including closure of garment factories in Indonesia). But offshoring has recently been accelerated by the Covid-19 pandemic after 2020, as Chinese firms established operations elsewhere in response to western buyers reducing their dependence on producers in China disabled by China's savage Covid lockdowns, and the Biden and Trump tariffs on exports from China, which have led to a wave of exports from Vietnam, India and elsewhere using imported Chinese components and a fall in direct exports to the US.

Since President Xi took office in 2013 the Chinese Communist Party has steadily tightened its grip on the

country's private sector. But contrary to western presumptions about authoritarian regimes and contrary to the experience of the Soviet Union (Wade 2023), this tighter political control has gone with a big jump in upgrading and innovation.

In 2015 Xi's government launched the 'Made in China 2025' plan, which called for pouring state resources into ten sectors, from robots, machine tools, advanced rail equipment, high-tech maritime vessel manufacturing, aerospace and aviation equipment, to electric vehicles (EVs) and next generation information technology. The state identified these sectors as strategic for the economy's transition to a developed country, one that relies less on labour and Western supply chains and more on automation and domestically-developed technologies. But 'transition to a developed country' conceals the linked geopolitical objectives, namely, raise supply chain self-reliance to resist western interference, and raise foreign dependence on Chinese producers.

Hundreds of industries within these broad sectors were made eligible for extra-large subsidies and cheap credit (800 state-guided funds were established to support favoured industries). Also for inexpensive land and large innovation-related tax benefits. The state supported buyouts of foreign companies to tap their technology; and merger of state-owned enterprises to create national champions in telecommunictions, aviation and smart manufacturing (Leahy et al. 2025).

The Economist magazine, not usually enthusiastic about 'state intervention', declared in 2025 'It has, for the most part, been a resounding success. Aided by the government, Chinese firms have risen to the very top of some industries' (Economist 2025).

It is plausible that a sizable cause of the success in products noted earlier stems from support in the Made in

China 2025 plan, coupled with entrepreneurialism and intense competition in the vast Chinese market.

But it is generally agreed that China has fallen well short of the Made in China 2025 targets in high-end computer numerical control machine tools, the workhorses of manufacturing, also in civil aviation and in semiconductors. Moreover, critics claim that the plan has generated 'waste at an absolutely colossal scale', while Lee Branstetter and Guangwei Li – based on a small set of firms whose financial reports mentioned the words 'Made in China 2025' in the period 2015-2018 – conclude there is 'little statistical evidence of productivity improvement or increases in R&D expenditure, patenting and profitability' (Branstetter and Li 2022).

The plan and its follow-up so spooked the US government and other western governments that Beijing stopped referring to it. In The Economist's words, it 'is an initiative which induces so much fear and loathing abroad

that [since 2018] Chinese officials dare not speak its name.' US President Trump in his first term used the plan to help justify his trade war with China. The EU has protested the plan's targeting of sectors in which the EU specialises, raising EU trade tensions with China and raising support for higher trade barriers to protect strategic European industries (Leahy et al. 2025).

Overall, China's industrial progress has been so fast that angry trade partners accuse China of undercutting their companies and hollowing out whole manufacturing sectors. They launched almost 200 anti-dumping cases and other trade investigations against China in 2024. India made more complaints than any other country (Economist 2025).

But for all the trade tensions and the questions as to whether Made in China 2025 worked for China, a bottom-line measure of success is that as of 2024 China has more than 250 companies with a market capitalization of over

$1 bn and a free cash-flow yield of more than 10 per cent, while the US has fewer than 150 (Sharma 2025b). This for an economy whose average nominal income is only about 30% of the US's.

The next decade

China is fast moving away from dependence on foreign nations for energy, becoming the world's first 'electrostate', with a growing share of its energy from electricity generated by secure domestic sources and a growing share of its economy driven by clean technologies. Electrification in China has surged to 30% of energy, far ahead of the US and Europe at around 22%. There are now 58 nuclear reactors in operation, the second highest number after the US; and another 18 under construction (some sources say 10). Plans are in place to build as many as 30 in Belt Road Initiative (BRI) countries. Also, the state is investing massively to upgrade and expand the electricity grid, and the two

biggest battery groups (CATL and BYD) are channelling about 5% of their annual revenues into battery innovation. All this being said, it is also true that China remains the world's biggest greenhouse gas producer, and coal is still the dominant fuel in its electricity mix (White et al. 2025).

As for the new Intelligence Revolution, China looks set to rival the US over the coming decades. Led by the party-state, it is creating the biggest ecosystem of clean energy, batteries, EVs and AI. This is the industrial ecosystem of the future.

The US dominated the Second Industrial Revolution from the late nineteenth century because it had the biggest ecosystem of coal, steel, oil, combustion engines, and electricity. But it has been slower to create an Intelligence Revolution ecosystem within the US. Europe has been even slower (Friedman 2025).

Ironically, just as the ‘China shock’ pushed the US out of low-end manufacturing, the ‘Biden-Trump shock’ is doing the same in China. Beijing has concluded that innovation and control of core technologies are the only defences against high US tariffs and export controls. Hence the ‘AI+’ strategy aims to embed AI across the economy, drawing inspiration from the success of DeepSeek. The state is investing heavily in photonic quantum computing, low-orbit satellites networks (to rival Elon Musk’s Starlink), chipmaking equipment, factory robots – investing to encourage private sector investment, and it is being more supportive of the big private tech firms than it was in the decade after the North Atlantic financial crisis (Jin 2024).

For all China’s production prowess, it has not been able to compete in dozens of products that are building blocks of advanced manufacturing, and its leaders fear

that these ‘chokepoints’ leave it vulnerable to US pressure. They are deploying AI to overcome these chokepoints. [3]

Is China a challenge to US hegemony ?

For most of its several thousand years’ history as a political entity China has been the predominant state in East Asia, economically, politically, militarily, as seen in its ability to force bordering countries to pay tribute to the emperors. Today, the impressive production and technology trends just described might suggest that China is challenging the US for regional, even global hegemony.

This would be consistent with the arguments of international relations scholars including Paul Kennedy (1987), Robert Gilpin (1981), Susan Strange (1988), Charles Kindleberger (1973), that shifts in the global order

[3] Towards Science, 2025, gives a list of 20 high tech products for which China relies heavily on imports.

are driven by changes in economic capabilities, which feed through into changes in political and military alignments.

Here we note some factors that support the idea of China's challenge, and others that show the gap with the US.

First, the point already made about China's technology challenge, restated in the words of Elsa Kania, senior fellow at the Center for a New American Security: 'Once, American technological predominance was regarded as all but unassailable, and China tended to be dismissed as a copycat that was unlikely to close the gap. Today, recognition of China's potential to lead in new frontiers and strategic technologies is heightening the urgency behind US efforts and programs…' (Ioanes 2023).

Second, China is gaining 'alliance hegemony' in the global South, not through miliary alliances but trade and

infrastructure alliances. China is the biggest trading partner for a majority of countries (it is the biggest or second biggest for virtually all Latin American countries). The US government is putting intense pressure on countries, especially in Latin America, to cut trade with China as part of a general downgrade of their relations with Beijing. If these countries are faced with a choice between economic relations with China or the US, a sizable number may choose China – and then choose China also in political relations. Trump's tariffs on China and many more countries may bring forward the time when a large part of the world's population lives in a geopolitical system with China at its center.

As for infrastructure alliances, we see China's rise in the BRI, the world's biggest-ever overseas infrastructure building program. It was initiated in 2013-14 in the wake of the 2007-09 North Atlantic Financial Crisis, at a time when the government's response to the crisis had saturated the domestic market for railways, bridges, airports and other infrastructure at home, prompting the

government to develop alternative markets overseas – and divert some of its foreign exchange reserves from US assets (eg Treasury bills) into BRI loan assets. The BRI program has incorporated over 100 countries, encouraging the participating states to become more interdependent with the Chinese economy by building trading routes over land and sea across Eurasia and Africa and into Latin America. In addition to deeper trade and investment opportunities for China, plus loan repayment, China expects quid pro quo in other contexts, such as votes in the UN General Assembly, support for its threats against Taiwan, and more. The US is missing in action. One observer remarked, 'The Chinese bring their cheque books and the Americans bring their notebooks' (Mosbacher 2025).

Another case of China's alliance building concerns Taiwan. Over the past decade and intensifying since 2023, Beijing has waged a diplomatic offensive in the global South to secure support for its campaign of coercion against Taiwan to bring it under Beijing's control. The

offensive has worked. More than 70 countries have explicitly endorsed that China is entitled to use ‘all’ efforts to achieve unification of Taiwan with China (previously China had secured support for a statement referring to ‘peaceful efforts’ or just ‘efforts’). In contrast, the US and the western bloc support ‘strategic ambiguity’ vis-à-vis Taiwan.

A third point in support of China’s challenge to US hegemony is that Beijing is mounting a big-push to gain the upper hand in international technical standards, which give political influence in the international trade system and shape the geographic distribution of trade. The underlying logic is caught in the remark of the 19th-century German industrialist Werner von Siemens, ‘he who owns the standards, owns the market’. A business or a government that can influence the content of a standard in the early stages gains a baked-in competitive advantage. China’s 13th five-year plan, adopted in 2016, announced the aim of dominating the setting of international technical standards. The Made in China 2025

policy and China Standards 2035 take the drive forward. In the most important international standards body, the International Organisation for Standardisation (ISO), major corporations from the US, UK, France and Germany ran the secretariates of 60% of the ISO technical committees and subcommittees in the mid 2000s, those from China, 1%. By 2019, the big four's share fell to 52%, China's rose to over 10%. China's Next Generation Artificial Intelligence Development Plan, published in 2017, makes clear that China is to be a leader in global AI standards development by 2030.

China is also following a parallel track, alongside its work in international organizations, to promote the adoption of its own technical standards. Countries in receipt of loans and companies from China under the BRI land and sea infrastructure projects are required to accept *Chinese* technical standards as a precondition for Chinese engagement. So far more than 50 countries and regions have signed technical standardisation agreements with China (Burbaumer 2025).

On the other hand, several other indicators suggest China remains a long way from challenging US hegemony broadly construed (Starrs and Wade 2025). First, the military. The US military accounts for more than one third (39%) of the world's military spending, maintains more than 700 overseas military bases, and operates 12 aircraft carriers, of which 7 are dedicated to the US Pacific Fleet (China has 2 that are operational). China is ranked 3rd in military strength in the world after Russia.

Second, the US dollar is an obvious example of a pillar of structural power controlled by the US state. Countries other than the US need to stockpile dollars with which to purchase imports (notably critical imports like oil) and even more, to hold their foreign exchange reserves in dollars, seen as a safe, rule-bound store of value. They tend to invest these stockpiled dollars by purchasing US assets, especially US Treasury bills. That in itself renders them vulnerable to US pressures. US de facto control over

the SWIFT inter-bank payments system, which handles almost all bank international transactions, bolsters the structural power the US derives from the international role of the dollar. Even transactions between a Shanghai bank and a Sydney bank can be blocked by the US state through the global dollar payment system (Wade 2024).

The Chinese RMB, by comparison, still has a marginal role in international transactions and foreign exchange reserves. It is striking that the BRI's transactions are mostly in US dollars. Both the Asian Infrastructure Investment Bank (created in 2015, led by China, based in Beijing) and the New Development Bank (created in 2015, based in Shanghai) denominate their lending mostly in dollars. No doubt the role of the RMB and some other 'non-hard' currencies in international transactions will grow. But over the next two decades the US dollar will likely remain the most important international currency and permit the US government to 'weaponize' the dollar for sanctions on individuals, companies and states.

Third, another indicator of US structural power is the dominance of US corporate ownership in total corporate ownership globally, and specifically in corporate ownership in China. The era of 'production and finance globalization' led by the US state and US capital since the 1990s means one cannot assume that most production in a given territory is produced by national firms and that profits from overseas sales of domestically-produced goods flow back to the national territory.

The post-1990s in China have been driven to a large extent by foreign capital in the advanced sectors, with production credited to China but most *profits* accruing to the US, Japan or Europe. In other words, China remains highly dependent on foreign companies producing in China. Apple smart phones are a well known case. Apple contracts with the Taiwanese firm Foxconn to manage giant factories in China assembling Apple phones (one facility has more than 200,000 employees, Foxconn

employs over one million in China). Only a small part of the total value-added at sale accrues within China, as distinct from in the US and Taiwan.

For example, China is the biggest global producer of computer hardware and software, but in 2024 86% of *global profits* in this sector accrued to US-based companies (among the Forbes Global 2000 companies), only 6.3% to China-based companies.

China has been the world's biggest exporter of electronics since 2004, but in 2024 only 11% of global electronics profits accrued to China, compared to 43% to the US, 17% to Taiwan and 12% to Japan (Starrs 2025).

In 2022 China's 'foreign-invested enterprises' (FIEs, with 50% or more foreign ownership) owned *three quarters* of exports 'processed with imported materials' (to use the China Customs category). That foreign-owned three quarters of exports processed with imported materials

amounted to about a third of China's total exports – but included most of the advanced technology exports (including all electronics). After 2018 and the first Trump government trade war, Chinese-owned private firms doubled their share of advanced technology exports from 10% to *20% by 2024,* as more foreign firms shifted production to Southeast Asia to escape Trump tariffs. But 20% share of advanced technology exports in the hands of Chinese private firms remains a small share !

Of the 25 broad sectors of the Forbes Global 2000, US-headquartered TNCs had the biggest share of *global profits* in 19 of the 25 sectors in 2024, China had the biggest share in 4, Japan in the other 2 (Starrs 2025).

Since the first Trump government starting in 2017, and intensified by the Biden government starting in 2021, the US state has been using its structural power aggressively to :

(a) blockade some of China's top high tech firms with controls against exports to China – export controls not only on US companies but also on some of its allies (eg ASML of Netherlands, monopoly maker of the machines to fabricate the most advanced semiconductors);

(b) launch an unprecedentedly well-financed industrial policy for raising American innovation and high tech manufacturing at home, including for semiconductors and data centers;

(c) strengthen military alliances in the Asia-Pacific region.

Here the irony needs to be highlighted. The US is able to finance these 'contain China' projects – and many other projects aimed at strengthening the US's structural and relational power – thanks to how China (and other countries) recycle their US dollars into the US. Recall that China is running a trade surplus of almost $1 trillion and invests a significant portion in US Treasury bills, because of the dominance of the dollar as the international currency and store of value. As Sean Starrs puts it, 'No

other empire has ever constructed a financial system in which the chief geopolitical rival is structurally bound to finance its own containment' (2025).

Patent revenue data reinforce the point about the distribution of profits in favor of US-based firms. By 2022 China was filing more patents than the rest of the world combined (all patents filed anywhere including in China, where many patents are spurious). A better measure of technological innovation than patent filings is a country's balance of payments in intellectual property licensing, which reflects *patent commercialization*. Here the US is the world winner, by far. Its *surplus* in intellectual property licensing fees rose fairly steadily from $24 billion in 1997 to $87 billion in 2023 (nominal prices). Over the same period China went from zero to a *deficit* of $32 billion. China is paying out far more for access to foreign technologies than it is receiving for foreigners' access to its own patented technologies.

A final point is that the US remains the biggest shareholder in the 'legacy' multilateral economic organizations (created in the twentieth century), including the IMF, World Bank, Interamerican Development Bank, Asian Development Bank (alongside Japan), and European Bank for Reconstruction and Development; also the biggest non-regional shareholder in the African Development Bank. Recent, painfully negotiated increases in IMF quotas and multilateral development bank capital have left formal power in the hands of the US and other legacy western states (Vestergaard and Wade 2025).

An inflection point arrived in 2015, when China led the creation of a new regional development bank, the Asian Infrastructure Investment Bank based in Beijing, and China with Brazil led the creation of the world's first *global* development bank since the World Bank, the New Development Bank based in Shanghai. Both have cooperated more than challenged the legacy organizations (Nogueira Batista Jr. 2022).

Conclusions

First, China has become the leading country in global production and exports, 'the factory of the world'. While remaining the leading producer of low- and mid-tech products it has also more recently become a major producer of high-tech products, including new-to-the-world high-tech products. Compared to the rest of world history it is nothing short of miraculous that a country this big in population and this poor in average income has become a leading innovator across a range of high tech industries.[4] Its trajectory contrasts with that of the earlier – much smaller -- developers in northeast Asia (Japan, South Korea, Taiwan) in that as wages rose they offshored labor-intensive industries and value-chain segments to China, Indochina and Southeast Asia, generating the offshoring pattern known as 'flying geese'. In contrast, China moved more operations towards cheaper regions of

[4] For a more sceptical understanding see Yue 2024.

China. China's share of global low value-added exports has held up even as its share of global high value-added exports has risen substantially – intensifying pressure on production and employment in the rest of the world. But offshoring has increased since the early 2020s due to the disruptions of Covid and US sanctions, to other parts of Asia and to Mexico.

Second, China is now struggling to escape from the wreckage of its burst property bubble, and to manage the effects of its falling population, as median age rises (almost two years more than the US's) and working age numbers shrink, even as average income remains far down the world ranking. China's leaders are deeply worried that 'China becomes old before it becomes rich'.

Third, one cannot straightforwardly translate China's production dominance into China as a global economic superpower. One indicator is that Chinese firms do not control a large part of the total profits generated from

China's exports; US firms accrue the lion's share in the advanced sectors. By extension, *the major decisions at the top of the global production structure are still made in US corporate boardrooms,* not in Chinese corporate boardrooms or at the top of the Chinese party-state.

Fourth, this point about US dominance in the distribution of global profits -- together with dominance in the fields of military, finance, and patent commercialization -- support the conclusion that the US remains the nearest state to a hegemonic global power, even if less elevated than it was in the so-called unipolar moment from around 1990 (end of the Soviet Union) to around 2010 (following the 2007-09 North Atlantic financial crisis).

Fifth, the US has become deeply polarized, and the historical record shows – notably Chinese and Russian history – that countries that turn in on themselves tend to collapse in their international power. The second Trump

presidency is well organized to ‘make America great again’ by having the MAGA shock troops first destroy their internal enemies. Trump has said the ‘enemy from within’ is ‘more dangerous’ than Russia and China. Trump appointees are turning US institutions upside down in pursuit of vengeance, seeing independent institutions -- including the military, the justice system, even the central bank -- as a threat and appointing proven Trump loyalists to head them.

America’s greatness has rested on the rule of law, which is why foreigners trust US assets and the dollar. But Trump has converted the presidency from a ‘rule of law’ executive to a vengeful ‘rule by law’ national CEO. His appointees to top positions have been vetted and trained over the previous four years by the Heritage Foundation, with loyalty to the ruler (not the constitution) as their top priority. Many legal experts agree with Erwin Chemerinsky, dead of the law school at the University of California, Berkeley, in early February 2025, ‘We are in the midst of a constitutional crisis right now …. There have been so many

unconstitutional and illegal actions in the first 18 days of the Trump presidency. We have never seen anything like this' (Liptak 2025).

Sixth, the second Trump government seems intent on dramatically unwinding commercial ties between the US and China -- raising tariffs on Chinese imports, tightening US export controls, restricting US firms' investments that could aid China's military, and restricting Chinese people's ability to buy critical American firms and assets. US actions to contain China are justified, in the words of Robert Atkinson, president of the US-based International Information Technology and Innovation Foundation, on grounds that 'the world is now distorted by its strongest power player' (2025). He implies that the world where the US with 4% of world population accrues around 25% of world GDP is *not* distorted.

Meanwhile, Beijing is cautiously trying to determine what the US president wants. Mr Trump claims he has a

great relationship with Mr Xi and would like to see more Chinese investment in the US. Chinese think tank officials have begun floating ideas for a bilateral trade deal, including major investments in areas like EVs, batteries and solar panels, and purchase of more goods and services in agriculture, aerospace, energy, technology, and even more US Treasuries (Swanson and Stevenson 2025).

Seventh, the second Trump government seems intent on destroying the European Union. At the first meeting of the new cabinet in late February 2025 Mr Trump said, 'The European Union was formed in order to screw the United States. That's the purpose of it, and they've done a good job of it.' Then he said he was prepared to hit the EU with 25% tariffs on cars and other goods (Erlander 2025).

Secretary of State Marco Rubio declared at his Senate confirmation hearing, 'The post-war global order is not just obsolete. *It is being used against us*' (emphasis added).

Moscow and Beijing must be pleased to find the Trump government working to bring about what they have long worked towards, the erosion of the western alliance (Rachman 2024).

Eighth, two deep ironies in the US-China relationship. One, noted earlier, is that China invests a large part of its giant current account surpluses in safe US Treasury bills and related investments, thereby helping to finance the US's efforts to contain China. No other empire has constructed a financial system in which the chief geopolitical rival is bound to finance its own containment. The second is that China produces most of the world's supply of rare earth minerals and rare earth magnets, needed for making a wide range of products including cars, drones, robots, missiles. Having shut down its own mining for rare earth minerals in the 1990s, the US now depends entirely on China to supply it with certain rare earth minerals, notably samarium, essential for making the missiles and fighter jets pointed at China.

Finally, President Xi is challenging the supremacy of the US like no Chinese leader before him. He bets he can outlast whatever pressure the US state brings to bear, because the US state is vulnerable to public discontent, as China's is not -- or so Xi expects. END

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