CHAZEN INSTITUTE RESEARCH BRIEF

The Race to Innovate

KEY TAKEAWAYS

- ✓ China's technological progress has benefited tremendously from its integration with developed countries, most notably the US.
- ✓ Higher levels of decoupling are followed by periods of Chinese dependence on their American counterparts, suggesting a reliance on foreign innovation to stay on pace with global advancements.
- ✓ Decoupling has adversely affected firm efficiency and valuation in China, but has not inflicted any damages on US companies to date.
- ✓ While the US maintains a technological edge, China is closing the gap in both R&D expenditures and patenting activities.

It used to be that China and the United States shared intellectual property for mutual benefit (yes, really!). But more recently, growing mistrust between the two countries has led to policies—everything from trade tariffs to stronger IP protections—that discourage knowledge sharing. How has this shift to protectionism affected marketplace competition? And at what cost to Chinese and American companies?

In "Mapping US-China Technology Decoupling, Innovation and Firm Performance," **Chazen Senior Scholar Wei Jiang** and colleagues from Peking University's Guanghua School of Management and Cheung Kong Graduate School of Business evaluate technology decoupling—that is, reducing or ridding its product development of dependence on outside components and concepts—between the two countries over the first two decades of the 21st century. What the data show is that China has benefited from its integration with the developed world, especially the US, and decoupling has created a barrier to innovation for Chinese companies.

Research

This is the first empirical study to assess the degree of US-China technology decoupling over time. Researchers analyzed data from the United States Patent and Trademark Office (USPTO) and the Chinese National Intellectual Property Administration (CNIPA), and quantified the levels of technology decoupling between the two countries by measuring the propensity for a domestic patent to cite a foreign patent versus citing another domestic patent.

For example, patents filed in one country in a technology class that never cited patents in the other country would suggest two completely decoupled or separate ecosystems of innovation. Conversely, a completely integrated systems would mean patents in either country cite patents in the other at the same rate they cite domestic patents.

Researchers then examined the economic outcomes at the industry level and at the firm level from 2000-2019.

Results

The research reveals that growing integration—not decoupling—has been the defining characteristic of US-China technological competition in the 21st century. Indeed, it is this level of integration that has ignited China's emergence as a global technological power. And while the US maintains an overall advantage in innovation, based on the share of global R&D, China is closing the gap in both R&D expenditures and patenting activities, particularly when it comes to drones and AI technologies.

The analysis shows that China has relied heavily on adopting cutting-edge technologies, especially those developed by the US. This technological dependence with the US peaked in 2008. After that, China was able to build stronger domestic technological capability and decrease its dependence on the US—in other words, increasing the level of decoupling.

But such decoupling comes with a cost to Chinese companies. The research finds that a more decoupled system creates a barrier for further learning and knowledge development, hindering Chinese companies' ability to innovate at the pace of their American counterparts. In order to remain competitive, Chinese companies need access to foreign technology.

In addition, the analysis indicates that increased US-China technology decoupling is followed by higher patent outputs for both US and Chinese companies. However, firm efficiency and valuation suffer in China, suggesting a cost for "reinventing the wheel" in a decoupled world. Decoupling has not inflicted any damages on the productivity and valuation of US companies, on the other hand, presumably because they maintain a competitive edge in most fields.

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Innovation Edge

Figure A shows Research & Development (R&D) expenditures of China and the United States, measured in billion 2005 PPP dollars. Figure B shows the number of patents granted at the Chinese National Intellectual Property Administration (CNIPA) and the United States Patent Trademark Office (USPTO) respectively, measured in thousands.

Figure A
R&D Expenditures

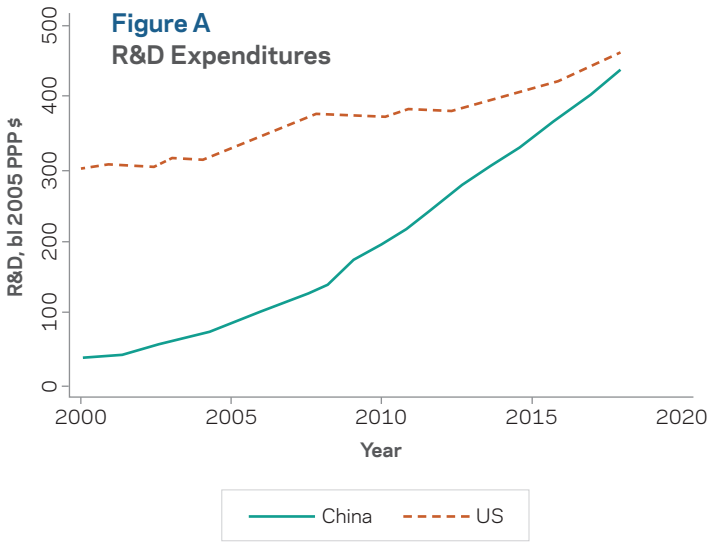

Figure B
Patents Granted