Assessing the Strengths and Limitations of China’s Technology Transfer Policies


“Tech extractors” are a form of technology transfer policy used in China that condition foreign access to China’s market on technology transfer to domestic firms. These policies contributed powerfully to China’s economic and technological rise, helping to transform the country into a world leader in sectors like high-speed rail and artificial intelligence. At the same time, they hastened the U.S.-China trade war and the escalation of strategic competition. However, relatively little is known about when and how China used tech extractor policies after it joined the WTO in 2001. What explains the rise in use of these policies the decades after China joined the WTO? And why does China impose these measures in some industries but not in others?

**The data.** The study draws upon manual analysis of over 500 pages of Chinese-language regulations on three policies that make up the concept of tech extractors from central state agency websites and the Peking University Laws and Regulations Database, an online repository of laws and regulations issued in China since 1949. The study measured several variables of interest, such as joint venture requirements and other foreign direct investment (FDI) ownership restrictions, using the Foreign-Invested Industry Guidance Catalogue (FDI Catalogue). The study identified 237 unique FDI ownership restrictions spanning 92 (of 420) industries and measured these restrictions by manually matching Chinese industry descriptions in the FDI Catalogue to industry descriptions in the 2017 revision of the Chinese Standard Industrial Classification system.

**Strategic industry status correlated with the use of tech extractors.** The author defines strategic industries as those with great economic or military utility that often generate significant positive spillovers and do not easily diffuse across national borders. Using data on global R&D expenditures from the Global Innovation 1,000 dataset and the U.S. Defense Logistic Agency’s Strategic Materials list, the author classified industries in the sample as either strategic or non-strategic.

**Insights**

- China’s imposition of policies that condition foreign access to China’s market on technology transfer to domestic firms rose six-fold between 2002 and 2012, with 85% of the increase occurring in strategic industries.
- Tech transfer policies were far more likely to be imposed in industries heavily reliant on China’s market to sell finished goods (like automobiles) versus industries reliant on processing foreign inputs for re-export abroad (like semiconductors).

The analysis shows that following China’s accession to the WTO, the total number of tech extractors in place — including ownership restrictions on inward foreign direct investment, local content requirements, and preferential public procurement policies — increased more than six-fold between 2002 and 2012, from 53 to 339, covering over 100 distinct industries. In a series of regression models, the author finds that an industry’s strategic status was positively and significantly correlated with the use of tech extractors, and that China’s use of tech extractors peaked in the post-2006 period. In all, strategic industries accounted for 85% of the increase in the use of tech extractors after 2002.
The author suggests that tech transfer policies result from the bargaining power dynamics between China's government and multinational enterprises (MNEs). Strong enforcement capacity and market access control in China increase the government's bargaining power, while employing a large workforce in China and controlling access to overseas markets strengthen MNEs' bargaining power.

China's positioning in global value chains correlated with use of tech extractors within strategic industries. The author finds that China has used tech extractors aggressively in some strategic industries like automobiles, aircraft manufacturing, and power generation, but more sparingly in others like precision measurement equipment and semiconductors. The analysis suggests that China's ability to impose tech extractors is correlated with China's location in global value chains within a given strategic industry. Drawing on Chinese Customs Data, the author estimated that China is twice as likely to impose tech transfer policies in industries heavily reliant on China's market to sell finished goods versus industries that rely on China to process and assemble foreign inputs for re-export abroad. Specifically, as the share of imports in a strategic industry that are tied to processing and re-exporting abroad reaches 100%, the expected number of technology extractors in place declines from four to almost zero.

Centralized industrial policies effectively support state interests. This study explores how institutional reforms that reduced domestic political fragmentation and centralized decision making improved China's bargaining power over foreign commercial actors. At the same time, the findings suggest that positioning in global value chains can powerfully constrain how China pursues its policy goals. Taken together, this research indicates that while China has effectively implemented a centralized technology extraction regime, it still faces constraints in wielding it across all desired industries.