

Technological Decoupling Between the U.S. and China

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Abstract: In this paper, we address the ongoing debate on technological decoupling by examining the effect of U.S. export controls and China's import tariffs on trade. By creating a detailed mapping between the products under the US export controls and 10-digit HS codes of US export products, we analyze the differences in U.S. export reductions to China compared to other countries in 2017-2021. Contrary to expectations, we find no evidence that U.S. export controls have led to a decrease in exports to China; in fact, these exports are either neutral or tend to increase relative to other countries. Additionally, our research indicates that China's imposition of additional import tariffs will likely diminish U.S. exports to China.

Keywords: Export regulation; Trade; Tariffs, Technological decoupling; United States; China

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Proposal

Since the 1990s, China has expanded its exports by leveraging cheap labor, becoming the world's largest exporter. As its economy grew, China aggressively invested in research and development to acquire advanced technologies, posing a challenge to the technological dominance of the U.S. Meanwhile, protectionist sentiments have emerged in the U.S., fueled by a significant trade deficit with China and concerns over Chinese technological advancements. This led to former U.S. President Trump imposing sanctions on China, citing intellectual property rights violations as unfair trade practices.

Invoking Section 301 of the Trade Act of 1974, the U.S. imposed a series of tariff measures against China in 2018 and 2019, to which China retaliated with countermeasures. To alleviate the resulting tension, the two governments signed the Economic and Trade Agreement, also known as the Phase One Agreement, which took effect in February 2020. Consequently, tariffs previously imposed on many products were suspended in both the U.S. and China throughout 2020. However, starting in 2021, the U.S. began to reimpose additional tariffs on these products, with the exception of some medical items.

In August 2018, the US government re-enacted the Export Controls Reform Act of 2018 (ECRA), strengthening export controls on dual-use goods for national security reasons. While these controls apply to all countries, the U.S. has specifically intensified controls on exports to China by adding a growing number of Chinese companies to the export control lists. In response, China revised its Catalogue of Technologies Prohibited or Restricted from Export, known as the Second Revision, in August 2020, marking its first update in twelve years since 2008. Subsequently, in October 2020, China enacted the Export Control Law, establishing a comprehensive legal framework to regulate exports from a national security standpoint.

Given these developments, there is growing concern that increasingly restrictive measures may have adverse effects on trade between the U.S. and China. The concern is particularly acute for high-tech goods and services, as many dual-use items fall into this category. Tighter U.S. export controls could lead to a technological split, or decoupling (decrease in trade in high-tech goods and services), between the U.S. and Chinese economies. Moreover, the global value chains over recent decades have fragmented the production process of high-tech products like computers and telecommunication equipment, with countries becoming specialized in specific stages of manufacturing. As a result, more stringent regulations in each country could exacerbate technological decoupling, impacting not just trade between the U.S. and China but potentially affecting other countries as well.

While numerous empirical studies have examined the impact of the U.S.-China tariff war¹, there is still a lack of quantitative analysis on the broader consequences of technological

¹ See for example, Fajgelbaum and Khandelwal (2022) for a review of this literature.

decoupling between the two nations, despite its significant implications for the global economy. A key reason for this gap is the absence of correspondence tables that align trade statistics codes, such as the Harmonized System (HS) codes, with the codes used in U.S. export control regulations, which reflects the differing objectives of these coding systems.

Against this backdrop, our study focuses on the U.S. initiative to strengthen trade controls and regulations on dual-use items for security purposes. We examine the impact of tightened export controls on U.S. exports to China by utilizing quarterly U.S. exports data, disaggregated by partner country and detailed product category at the HS 10-digit level. This study spans from January 2013 to June 2024. We have developed correspondence tables between HS codes and U.S. export control regulation codes using various methods, including machine learning (ML) techniques. Additionally, for comparative analysis, we investigate the effects of China's additional tariffs on goods imported from the U.S. on the U.S. exports to China.

Our findings can be summarized as follows: First, our comprehensive mapping of U.S. export controls onto HS 10-digit level product categories indicates that the industries with a relatively high share of controlled products are chemicals, plastics, machinery, transport equipment, precision instruments, and arms. Second, our analysis reveals that the overall tightening of U.S. export control regulations has not led to a substantial reduction in exports to China. At the same time, China's import tariffs have had a negative impact on U.S. exports. Finally, the impact of export controls was not uniform across industries. For example, exports of transport equipment were negatively affected by export controls, while the stone, machinery, and precision sectors experienced an increase in exports of the controlled items. Overall, these findings align with the U.S. government's "small yard, high fence" strategy, which aims to safeguard key and sensitive technologies from being leaked to countries of concern, while keeping the economy opened to trade.

In summary, our paper contributes to the ongoing debate on U.S.-China technological decoupling. By conducting a detailed, product-level empirical analysis, we aim to present a concrete assessment of the impact of export control regulations. Additionally, we contrast this impact with the effects of China's import tariffs. Our empirical findings suggest that while export controls do not appear to reduce exports, the imposition of additional tariffs negatively affects exports. These results offer valuable insights for both scholars and policymakers amidst escalating geopolitical tensions.