Wars Without Gunfire: Global Supply Chain Responses and Adjustments to Technology Sanctions *

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Abstract

The growing inclusion of Chinese tech firms on *Entity List* restricts their access to advanced U.S. products and technologies, significantly disrupting global supply chains. In this paper, we document the responses and adjustments of global supply chains to these sanctions. Contrary to expectations, we find that suppliers affected by these sanctions experience a 9.6% increase in sales revenue and a 10.8% rise in profits after their customers are sanctioned. This growth is mainly driven by heightened domestic substitution demand from the sanctioned firms, as well as enhanced reputations tied to nationalism and technological capabilities, with government involvement playing a role. Furthermore, the negative impact of sanctions propagates downstream, severely reducing the profitability of Chinese customers while simultaneously strengthening the market competitiveness of U.S. customers.

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1 Introduction

As Donald Trump returns to the White House, discussions on U.S.-China competition are intensifying. The existing literature has well documented the impacts of the U.S.-China trade war. Studies using U.S. import and consumer price data empirically show that, while higher tariffs lead to a reduction in trade volume, import prices remain relatively unchanged. In other words, the tariffs on Chinese exports are fully passed through to U.S. importers and consumers (Amiti et al., 2019; Fajgelbaum et al., 2020; Cavallo et al., 2021). Similarly, Jiang et al. (2023) and Jiao et al. (2024) reach the same conclusion using Chinese export data. As an import trade barrier, the Trump tariffs have limited impact on Chinese industries, with the primary goal being to reduce the U.S.-China trade deficit rather than to impede China's technological advancement.

In contrast, the U.S.-China tech war, the most far-reaching technological conflict in the 21st century—particularly exemplified by *Entity List*—has a fundamentally different objective. The primary goal of *Entity List* is to limit designated firms' access to U.S.-controlled technologies. Initially used to restrict products or technologies with potential military applications for national security reasons, it has increasingly been employed to protect U.S. economic interests and technological leadership from the threat of Chinese technological advancements, especially following the Export Control Reform Act of 2018 (ECRA) and China's Made in China 2025 initiative, which outlines ambitious goals for advancing high-tech industries (Whang, 2019).[1][2] *Entity List* is a firm-level end-user-based export restriction, making it difficult for the sanctioned firms to circumvent. Suppliers from any country are prohibited from exporting products containing U.S.-controlled technology to firms on *Entity List*, directly disrupting global supply chains. This technological decoupling has struck a heavy blow to Chinese tech leaders, yet surprisingly, they seem to be recovering from

[1] In Figure 1 of Section 2.2 we can see that, since 2018, the scope of *Entity List* expanded rapidly, and the share of Chinese entities on *Entity List* has grown from 19% to 33% by 2024.

[2] For instance, in January 2025, the Bureau of Industry and Security (BIS) added 25 Chinese entities to *Entity List*, including chip manufacturer Sophgo, and lithography systems company RSLaser. Particularly noteworthy is the inclusion of large language model (LLM) company Zhipu and several of its subsidiaries, marking the first time a Chinese LLM enterprise has been sanctioned. BIS justified this action by stating that these entities were advancing China's military modernization through the development and integration of advanced artificial intelligence research, a claim that has been denied by the affected parties.

this supply chain disruption.[3] Our paper explores potential reasons for this resilience.

In this paper, we document the responses and adjustments of global supply chains to *Entity List*. These sanctions force upstream suppliers to reassess their relationships with sanctioned firms, potentially disrupting global supply chains. Surprisingly, we find that the performance of the affected suppliers improves after the sanctions are imposed. This is driven by a significant increase in domestic substitution demand from the sanctioned firms, as well as enhanced reputations for these firms in terms of nationalism and technological capabilities. Consequently, we observe a shift toward more localized supply chains, with government involvement playing a role. Additionally, the negative impact of the sanctions propagates downstream, severely affecting the profitability of Chinese customers, while simultaneously boosting the market competitiveness of U.S. customers.

Specifically, by exploiting the staggered introductions of U.S. sanctions against China, we examine how suppliers respond to these measures. *Entity List* aims to restrict designated firms from accessing controlled U.S. technology, and the Bureau of Industry and Security (BIS) does not provide advance notice to firms, preventing actions such as stockpiling or asset relocation. As a result, suppliers could not have anticipated these sanctions. Moreover, the impact of the sanctions is likely unrelated to the characteristics of these suppliers, making this a suitable context for applying a difference-in-differences (DiD) specification. To identify relevant comparisons, we group Chinese tech firms based on their technological advantages and business scope, aligning them with the sanctioned firms within the same technical peer group. We then compare the performance changes of their suppliers before and after the sanctions. Following Crosignani et al. (2023), we include industry-country-size quartile-year quarter fixed effects to control for time-varying shocks at the industry, country, and macroeconomic levels (e.g., COVID-19 and the Trump tariffs in the U.S.-China trade war) that could impact firms of varying sizes. We also exclude Russian firms, Ukrainian firms, and non-Chinese sanctioned firms, along with their suppliers and customers, to eliminate the potential impact of the Russia-Ukraine war and other sanction activities on the estimation.

Our main findings are as follows. First, while the sanctions increase inventory pressure on suppliers, they also boost sales and profitability. Our estimates imply that the sanctions lead to a 12.6% increase in inventory for affected suppliers, with

[3]Huawei released smartphones using advanced chips produced by Chinese chip manufacturers. See https://www.nytimes.com/2023/09/06/business/economy/huawei-phone-us-china-raimondo.html?searchResultPosition=2.

their sales revenue and profits rising by 9.6% and 10.8%, respectively. The event study analysis reveals that these effects do not result in long-lasting performance changes. Additionally, the impact is more significant among Chinese suppliers and those with more vulnerable supply chains. We then explain these somewhat counterintuitive findings from the perspective of supply chain localization: the sanctions drive a significant increase in demand for domestic substitutes from the sanctioned firms, creating new growth opportunities for Chinese suppliers.

Second, we test our hypothesis by applying a supply chain relation level specification. Results show that the sanctions significantly increase the likelihood of Chinese suppliers maintaining and establishing supply chain relations with the sanctioned firms, while having no impact on U.S. or third-country suppliers. Moreover, the sanctions appear to enhance the reputation of the designated firms in terms of nationalism and technological strength, which makes domestic suppliers more inclined to establish supply relations with them. Politically connected firms are more likely to find domestic substitutes, implying that governments may play a role in this process.

Finally, we also examine the downstream propagation of the sanctions. Results show that sales revenue and profit of the affected customers decline by 8.1% and 8.4% on average after the sanctions, with no significant change in inventory. The upstream product shortages severely disrupt the operations of these customers, particularly Chinese firms and those with vulnerable supply chains, which in turn gives U.S. customers a competitive advantage in the downstream markets.

This paper contributes to the literature by providing comprehensive empirical evidence on the impact of sanctions on supply chain. The closest study to ours, Han et al. (2024), measures the impact of U.S. sanctions on U.S.-China technology decoupling and its spillover effects on supply chain innovation. Our study is partially consistent with Han et al. (2024), as both conclude that sanctions have asymmetric effects on upstream and downstream firms—typically boosting the performance of upstream firms while negatively affecting downstream firms. However, our findings complement this literature in three key ways. Firstly, Han et al. (2024) uses IO tables to identify upstream and downstream relations and assess the impact of sanctions at the technology class level. However, this approach may result in the loss of firm-level information, as *Entity List* targets individual firms. By capturing the impact of sanctions at the firm level and identifying supply chains through inter-firm relationships, we can accurately estimate the effects of sanctions on upstream and downstream firms. This also allows us to explore the heterogeneity of these effects at the firm

level, including variations by firm countries and supply chain vulnerabilities, which previous literature has not addressed. Next, our supply chain-level analysis provides a detailed discussion of the mechanisms driving the enhanced performance of suppliers under sanctions, offering strong empirical evidence. This serves as a significant complement to Han et al. (2024), which does not empirically explain the occurrence of this phenomenon. Lastly, by leveraging detailed information on supply relationships and the involved firms, we investigate the roles of subsidiaries, firm reputation, and government influence in the supply chain adjustment process. This offers a more comprehensive understanding of the driving factors behind supply chain shifts due to the sanctions, an area that has not been fully explored in previous research.

Our paper complements the emerging literature on how U.S.-China competition affects global supply chains. Existing literature has extensively examined the impact of the U.S.-China trade war from various perspectives, including trade volume, extensive and intensive margins, consumer welfare, and trade diversion. These studies generally find that tariffs have reduced U.S.-China trade and disrupted global supply chains, with the cost primarily borne by U.S. importers and consumers (Amiti et al., 2019; Fajgelbaum et al., 2020; Cavallo et al., 2021; Jiang et al., 2023; Jiao et al., 2024). Higher tariffs have also led to supply chain adjustments and created net export opportunities for third countries (Fajgelbaum et al., 2024). Using Chinese export data, Jiang et al. (2023) and Jiao et al. (2024) show that the tariffs have altered China's export destinations. Furthermore, Alfaro and Chor (2023) and Freund et al. (2024) indicate that while some developing countries have partially replaced China as suppliers to the U.S., they have also increased their imports from China, suggesting that U.S. supply chains remain intertwined with China. Differently from these studies, our paper introduces a new perspective by examining the impact of U.S.-China technological competition on global supply chains. Specifically, we assess how supply chains respond and adapt to sanctions, providing fresh insights that complement and expand upon existing literature.

This paper also relates to the literature on how shocks propagate through supply chains. Several studies have examined how the effects of natural disasters spread and amplify along supply chains (Boehm et al., 2019; Carvalho et al., 2021). Crosignani et al. (2023) empirically analyze how "electronic disasters" (e.g., cyberattacks) propagate along supply chains and negatively affect downstream customers. Other research focuses on the transmission of financial shocks through supply chains (Alfaro et al., 2021; Demir et al., 2024). For instance, Alfaro et al. (2021) show that credit supply

shocks have significant direct and downstream effects on employment, investment, and output. Our study extends this literature by demonstrating that disruptions caused by sanctions can drive the localization of global supply chains. Specifically, we show that these sanctions encourage affected firms to establish more domestic supply chain relationships, highlighting a key mechanism through which sanctions impact supply chain dynamics.

The remainder of the paper is organized as follows: Section 2 provides the institutional background on *Entity List*; Section 3 describes the data and presents descriptive statistics; Section 4 discusses the empirical strategy and presents the results; Section 5 explores mechanisms from the supply chain perspective; Section 6 shows the downstream propagation of the sanctions; Section 7 concludes.

2 Institutional Background

2.1 Export Control and *Entity List*

The U.S. export control regime can be traced back to the Trading with the Enemy Act of 1917, which was used to restrict trade between the U.S. and the designated countries (Berman and Garson, 1967). After the World War II, the U.S. government still retained and further expanded the export control framework through legislation such as the Arms Export Control Act of 1976 and the Export Administration Act of 1979, which focused on controlling commodities and technologies with potential military applications. Therefore, the U.S. export control regime has long been seen as the economic arm to react the military-related national security concerns (Whang, 2019). However, the ECRA pushed by the Trump administration redefines national security to encompass the need to maintain U.S. global leadership, incorporating economic interests into the export control regime. The ECRA introduced "requirements to identify and control the export of emerging and foundational technologies",[4] which allows the U.S. government to implement export controls under the justification of national security to further its economic policy goals.

Entity List, an end-user-based export restriction list published by the BIS, is one of the most prominent firm-level export control measures.[5] First published in 1997, *Entity List* was originally designed to restrict entities that may be involved in activities related to the production of weapons of mass destruction from accessing specific

[4] 50 U.S.C. § 4817.

[5] The remaining firm-level measures are included in the robustness check in Section 4.1.

U.S. technologies. Over time, the reasons for inclusion on *Entity List* have expanded to include activities that threaten U.S. national security, foreign policy, or economic interests. *Entity List* targets firms, organizations, and even individuals, allowing it to directly and profoundly impact the designated entities and their supply chains. It mandates that designated entities must adhere to strict licensing requirements when exporting, reexporting, or transferring any items subject to the Export Administration Regulations (EAR). Any violation of the licensing requirements associated with *Entity List* can result in significant civil or criminal penalties for both parties involved in the transaction.

Notably, in addition to U.S.-origin products, *Entity List* also covers products from other countries, which have a nexus with controlled U.S. material or technologies. Specifically, if the value of U.S.-origin controlled components in foreign-made goods, software, or technology exceeds 25% of the total value, these items will be subject to *Entity List*.[6] For example, a precision German-made device valued at $100, which contains $25 worth of U.S. components, cannot be exported to China. Besides, for certain technologies like semiconductors and advanced-node integrated circuits, foreign-origin products are subject to *Entity List*, even if they do not actually contain these controlled technologies, as long as they were designed or manufactured with the assistance of such technologies. As a result, once a firm is added to *Entity List*, both its U.S. and third-country partners will cautiously reassess their supply relationships with it.

2.2 Restrictions on Chinese Technologies under *Entity List*

In 2018, the Trump administration issued a proposed rule seeking public comment, aiming to designate a range of technologies, including artificial intelligence, biotechnology and microprocessor technology as "emerging technologies" critical to U.S. national security, as a supplement to the ECRA.[7] The proposal was a response to China's Made in China 2025 initiative, which outlines several key high-tech industries that China plans to develop, potentially posing direct technological competition. However, the proposal covered an extensive array of civilian and commercial technology sectors, prompting strong opposition from many U.S. firms and universities. As a result, in 2020, the BIS implemented control measures on only six categories of

[6] 15 C.F.R. § 734.4.

[7] "Review of Controls for Certain Emerging Technologies", Commerce Department, 83 Fed. Reg. 58,201 (November 19, 2018). See https://www.federalregister.gov/documents/2018/11/19/2018-25221/review-ofcontrols-for-certain-emerging-technologies.

technologies that could be related to military applications, advanced semiconductor manufacturing, or digital surveillance.

However, through *Entity List*, the Trump administration implemented export controls on these "emerging technologies" in a more covert manner, achieving its objectives. Figure 1 illustrates the trend in the number of entities listed on *Entity List*, highlighting changes in the frequency of Chinese entities' inclusion and their relative share. Since 2018, the scope of *Entity List* has expanded rapidly, with the share of Chinese entities growing from 19% to 33% by 2024. Since 2019, more than half of the new entities added to *Entity List* have been from China. This trend continued until the outbreak of the Russia-Ukraine war in 2022.[8] After that, Chinese entities once again became the primary target of *Entity List*. In 2024, 266 Chinese entities have been added, making up 52% of the total new additions.[9]

From an industry perspective, most of the sanctioned Chinese companies are leading companies in high-tech industries. We list in Table 1 a selection of representative firms that are included on *Entity List*. These technological leaders are often criticized for supporting China's human rights violations or military advancements. However, the primary objective of the Trump administration is to restrict their access to controlled U.S. items, thereby limiting their technological progress. While controlled items traditionally included military technologies (e.g., aerospace, nuclear, and defense technologies), recent years have seen an expansion to encompass advanced civilian and commercial technologies such as artificial intelligence, quantum technology, and semiconductors (Han et al., 2024).

In the context of U.S.-China technological decoupling, the U.S. has placed many leading Chinese high-tech firms on *Entity List*, imposing strict restrictions on the import of high-tech products and the introduction of technologies. This prevents suppliers from exporting products or technologies related to controlled U.S. items to these sanctioned firms, directly causing disruptions and reorganization of global supply chains. The impact of sanctions will propagate through both domestic and international production networks, with suppliers and customers worldwide facing significant and widespread consequences (Han et al., 2024).

[8]To enforce sanctions against Russia, the BIS added 372 Russian entities to *Entity List* in 2022, accounting for 73% of the total new additions.

[9]Many firms appeared multiple times on *Entity List*. We only consider the date of their first inclusion. The specific *Entity List* is detailed at https://www.ecfr.gov/current/title-15/subtitle-B/chapter-VII/subchapter-C/part-744/appendix-Supplement%20No.%204%20to%20Part%20744.

3 Data, Sample Characteristics and Stylized Facts

3.1 Data Sources

The data used in this paper is derived from multiple sources, with the sample period ranging from the fourth quarter of 2016 to the second quarter of 2023. First, we obtain supply chain relationship data from the FactSet Revere database, which is the most comprehensive dataset of firm-level supply chain relationships currently available (Gofman et al., 2020). FactSet gathers relationship information from primary public sources, such as firm's public filings, investor presentations, and press releases. As of the second quarter of 2023, it includes data on over 48,000 companies globally and nearly 2 million relationships. The database provides the start and end dates, firms' information, and the type of each relationship, enabling us to match the firms with other datasets.

Second, we collect the complete list of entities on *Entity List* from BIS. Due to limitations of FactSet, we only considered entities that were added before the second quarter of 2023. These entities include firms, research institutions, and even individuals. Since universities, research institutes, and individuals typically do not engage in production activities and lack clear, comprehensive supply chain relationships, we focus solely on firms. We manually match the Chinese firms on *Entity List* with those in FactSet based on their names, and verify the accuracy of these matches through publicly available information. It is important to note that a significant portion of the entities are re-export firms, particularly those located in Hong Kong. These firms primarily engage in trade and resale, without direct involvement in production, and often operate as shell companies to obscure the origins and destinations of trade. As such, they generally have no publicly available supply chain information and are largely excluded after the matching process with FactSet, which is also subject to manual verification. Additionally, we exclude firms that were removed from *Entity List* after being added to avoid estimation bias. In total, we identify 89 sanctioned Chinese firms, all of which are technology leaders in fields such as semiconductors, artificial intelligence, cybersecurity, and quantum technology.

Third, we focus on the suppliers and customers of sanctioned Chinese firms to examine whether they have been indirectly affected by sanctions. Based on the supply chain information from FactSet, we identify 1,116 suppliers and 632 customers of the sanctioned firms. Additionally, we also identify suppliers and customers of non-sanctioned Chinese tech firms, using the "keywords" and "target company" in-

formation from FactSet, to create a control group for the DiD specification in our baseline test. Specifically, we categorize the core business activities of the sanctioned firms (e.g., artificial intelligence, biotechnology, semiconductors, cybersecurity, and space technology) by Large Language Model. Then, based on the "keywords" of each relationship and the description of target firms, we define suppliers and customers who have high-tech products supply relationships with those non-sanctioned Chinese tech firms as the control group. The "keywords" variable in FactSet summarizes the products involved in each relationship, allowing us to determine whether any of these relationships involved high-tech products that might be subject to sanctions. The characteristics of firms whose supply chains are affected, as opposed to those whose supply chains are not, are detailed in Section 3.2.

Finally, we obtain detailed quarterly financial data from the Bureau van Dijk Osiris dataset. The use of quarterly data allows for a more precise capture of the immediate impact of sanctions on the supply chain. We merge FactSet and Osiris using firms' names, ISIN codes, and countries as matching criteria to obtain a detailed view of the suppliers' and customers' performance. Firms not present in both datasets are excluded to avoid selection bias caused by small firms that are listed in Osiris but lack reported supply chain relationships (Crosignani et al., 2023). As is standard in the literature, financial firms are excluded from the sample. We also remove all Russian firms, Ukrainian firms, and non-Chinese sanctioned firms, along with their suppliers and customers, to eliminate the potential impact of the Russia-Ukraine war and other sanction activities on the estimation. Our sample consists of 2,504 firms from 2016:Q4 to 2023:Q2, corresponding to 68 sanctioned firms (See Table B1 in Appendix for the detailed list).

3.2 Sample Characteristics

We report the summary statistics of the main variables in Table 2, including the mean, standard deviation, percentiles, minimum, and maximum values. The sample period spans from 2016:Q4 to 2023:Q2. Panel A presents the summary statistics for the full sample, while Panel B compares the affected firms (treated group) and unaffected firms (control group). As shown, the treated and control firms have similar asset structures (total assets and intangible asset ratios), age, operational conditions (stocks and sales), profitability (profits and return on assets), and debt conditions (liabilities-to-asset ratio), indicating that the treated and control firms are generally comparable.

Sanctions have a negative impact on the Chinese tech firms. In Figure 2, we show a significant decline in the average stock price of these tech leaders following their inclusion on *Entity List*. What we are more interested in is whether this shock has spread throughout the supply chain. Our suppliers and customers come from 65 different countries, with the largest shares from China (36.1%) and the U.S. (16.5%), followed by Taiwan (5.2%), Japan (5.2%), and South Korea (5.0%). In Figure 3, we present the average stock price trends of the Chinese firms and the U.S. firms. We find that U.S. firms were almost unaffected after their Chinese partners were sanctioned, with the stock price continuing to rise. In contrast, Chinese firms exhibited different results. The average stock price of Chinese suppliers actually increased after the sanction, suggesting that the Chinese market may had higher expectations for them. But the Chinese customers were clearly negatively affected by the sanctions.

4 Baseline Results

4.1 Upstream Propagation of the Sanctions

Our objective is to estimate the impact of sanctions on the supply chain. *Entity List* restricts exports to the sanctioned firms, so the impact on suppliers is more direct. Therefore, in the baseline test, we are more interested in how suppliers are indirectly affected by the sanctions and how they respond to this impact (Further estimation of customers' responses to sanctions is presented in Section 5). The basic specification is as follows:

$$Y_{igt} = \alpha + \beta_1 Entity_{it} + \beta_2 Control_{it} + \delta_i + \omega_{gt} + \varepsilon_{igt} \tag{1}$$

where i denotes a firm, t denotes a year-quarter. g denotes the peer group of firm i, an NACE2 industry-country-size quartile combination. Y_{igt} is one of the firm performance variables (i.e., $lnStock$, $lnSales$, $lnProfit$), including net stated inventory (in logarithm), sales revenue (in logarithm), and gross profit (in logarithm). $Entity_{it}$ is an indicator equals one if firm i has a customer included on *Entity List* at time t. Coefficient β_1 reflects the difference in the performance of the treated suppliers and the control firms before and after the imposition of *Entity List*. We also include firms' age in logarithm ($lnAge$), return on assets (ROA), the ratio of liabilities to total assets (L/A), the ratio of intangible assets to fixed assets ($Intang$), as the control variables (i.e., $Control_{it}$), to control the potential impact of firms' profitability,

liabilities and asset structure.[10]

We include firm fixed effects δ_i to control for unobservable time-invariant firm characteristics. Time-varying shocks at the industry or country level may also impact firms' supply chain relationships. For instance, the COVID-19 had a greater impact on companies with more globalized supply chains. To address this, following Crosignani et al. (2023), we also include industry-country-size quartile-year quarter fixed effects ω_{gt} to control for time-varying shocks at the industry, country, and macroeconomic levels (e.g., COVID-19 and the Trump tariffs in the U.S.-China trade war) that may affect firms of different sizes. This allows us to estimate the core coefficient β_1 within a peer group, reducing model bias. Standard errors for all specifications in this paper are clustered at the country-industry level.

The purpose of *Entity List* is to restrict designated Chinese firms from accessing controlled U.S. technology. To ensure the effectiveness and deterrence of the sanctions, the BIS does not notify firms in advance, preventing them from taking actions like hoarding products or transferring assets before being sanctioned. As a result, firms are unaware of being sanctioned in advance, making it even less likely that their suppliers would have the anticipation. Additionally, the extent of the impact caused by sanctions is likely to be related to the characteristics of the sanctioned firms, such as their inventory and supply chain management capabilities, but it is almost impossible for it to be linked to the characteristics of their suppliers or customers. As shown in Table B2 in Appendix, the treated and control firms have similar pre-sanctioned characteristics.[11] This is also illustrated by the results in Section 4.3.

Table 3 presents the baseline tests results. Columns (1) and (2) show the impact on inventory, columns (3) and (4) focus on sales revenue, and columns (5) and (6) show the effect on gross profits. In all test specifications, the coefficient β_1 for $Entity_{it}$ is positive and statistically significant at the 1% level. These results remain consistent after including control variables. The coefficients imply that the sanctions lead to an 12.6% ($e^{0.1191} - 1$) increase in inventory, a 9.6% ($e^{0.0914} - 1$) increase in sales revenue, and a 10.8% ($e^{0.1023} - 1$) increase in profits for the treated firms relative to others. In other words, sanctions increase the inventory pressure on the suppliers, likely because they are unable to sell products to those sanctioned firms, resulting in inventory buildup. Surprisingly, they also improve the suppliers' performance on the sales and the profit side. We hypothesize that supply chain adjustments may

[10] See Table 2 for definitions and summary statistics of these control variables.

[11] Since we are unable to determine the timing of the shocks corresponding to each control firm, we chose the first period sample for comparison purposes.

explain this result, and further test it in Section 5. These results are similar to the finding of Han et al. (2024), which shows the promotional effects of sanctions on the performance of upstream firms.

In the baseline tests, our control group includes both suppliers and customers of the non-sanctioned Chinese tech firms. For robustness checks, we refine the control group by excluding the customers. Another concern is the potential impact of other U.S. government sanctions on our results. To address this, we control for industry-level time-varying factors by including peer group fixed effects ω_{gt} in the baseline tests, which accounts for the impact of product-level sanctions. Regarding firm-level sanctions, *Unverified List* targets entities with uncertain end-uses but does not impose substantial restrictions. Instead, it subjects exporters to additional scrutiny. *SDN List* targets entities linked to terrorism, drug trafficking, arms proliferation, and human rights violations, but does not prioritize U.S. economic interests or technological leadership. As such, these measures have minimal impact on global tech supply chains and are unlikely to significantly affect our identification. We also exclude entities on these lists, along with their suppliers and customers. Results from these checks, presented in Appendix Table B3, confirm that these factors do not alter the baseline results.

4.2 Placebo Test: Suppliers of Similar Firms

The observed changes in suppliers' performance could also be attributed to the emergence of revolutionary products or technologies. Innovations enhance suppliers' bargaining power within their peer group or the supply chain, boosting their sales and profitability, while also leading to an increase in the inventory of older products. This could interfere with the baseline results.

We conduct a placebo test to address this concern. Firstly, we identify the competitors of the a firm as its similar firms. When firms innovate, their competitors often quickly replicate these advancements and launch similar products to prevent the innovating firm from gaining a monopolistic advantage (Giachetti and Pira, 2022). For instance, after OpenAI launched its groundbreaking product, ChatGPT, companies like Google and Microsoft quickly released their own AI products. Thus, since the sanctioned firms and their competitors are similar in terms of business scope and innovation capabilities, we treat these competitors as similar firms.[12] We then investigate whether the supply chains of these similar firms are also affected by the

[12]We present the summary statistics of sanctioned firms and their similar firms in Table B4.

sanctions, by examining if the performance of their suppliers differs significantly from peer group after their Chinese competitors are sanctioned. If technological progress were indeed a core driving factor, we would expect to see a similar pattern in the performance of these suppliers. The results in Table 4 imply that the baseline results are unlikely driven by technological progress.

4.3 Event Study

We implement an event study specification to confirm the absence of pre-trends and examine anticipatory or phased-in responses to the sanctions. Following Braghieri et al. (2022), we estimate the specification:

$$Y_{igt} = \alpha + \sum_{k=-10}^{15} \beta_1 Entity_{i(t+k)} + \beta_2 Control_{it} + \delta_i + \omega_{gt} + \varepsilon_{igt} \tag{2}$$

where Y_{igt} is our firm performance variable, $Entity_{i(t+k)}$ is a set of new independent variables $Entity_{it}$, each adjusted by shifting the sanction time forward or backward by k periods. Following Liu and Mao (2019), we use the year quarter prior to the sanctions as the baseline period to avoid potential multicollinearity issues.

The results of Equation 2 are shown in Figure 4, which reveals that, prior to the sanctions, all coefficients are close to zero and exhibit no significant pre-trends, suggesting that there are no noticeable differences between the treated and control firms' performance before the sanctions. After the sanctions, the treatment effect shows an upward trend, indicating that the gap in inventory, sales, and profitability between affected suppliers and unaffected firms widens. However, from the 10th quarter onward, the coefficients gradually approach zero, suggesting that the effects of the sanctions are short-term and do not lead to lasting impacts on suppliers' performance. The findings in Section 5 can explain this trend: Supply chain adjustments to the sanctions affect the supplier's performance, and once these adjustments are completed, the differential impact of the sanctions diminishes.

The staggered DiD estimator is essentially a weighted average of different treatment effects (Baker et al., 2022). Sanctions implemented at different times may have varying effects on different treatment groups, leading to heterogeneity in treatment effects, which can introduce bias into the estimates (De Chaisemartin and d'Haultfoeuille, 2020). To address this, we apply the weighted group-time estimator and the stacked estimator to re-estimate the event study specification (Cengiz et al., 2019; Sun and Abraham, 2021), mitigating concerns about the reliability of

the staggered DiD estimator. As shown in Figure 5, the treatment effect trend remains consistent after using these robust estimators, indicating that the impact of heterogeneous treatment effects on our conclusions is minimal.

4.4 Heterogeneity

4.4.1 Supplier's Countries

This paper focuses on the impact of U.S. sanctions on Chinese firms, which may have the most direct and significant effects on both Chinese and U.S. firms in the supply chain. Among the treated group in our sample, nearly 62% of the suppliers are based in the two countries. Therefore, it is essential to conduct separate tests for Chinese and U.S. firms. Hence, we categorize the treated firms by their country of origin—Chinese, U.S., or from third countries—and compare them with the control firms to ensure that the control group remains consistent across all tests.

As shown in Table 5, the results indicate that, after sanctions, both Chinese and U.S. firms experience a significant increase in inventory. However, only those Chinese firms show improvements in sales and profitability, while sanctions have no significant impact on third-country firms. Based on our hypothesis in Section 4.1, we believe that the upstream supply chain of the sanctioned firms may undergo a shift toward localization.

4.4.2 Supply Chain Vulnerability

Most suppliers face a dilemma: whether to continue providing products or services to a few dominant customers or to seek a more diversified customer base (Irvine et al., 2016). Customer-dependent suppliers become more vulnerable to sudden disruptions if they cannot easily substitute the customers affected by a shock (Dhaliwal et al., 2016). Following Crosignani et al. (2023), we hypothesize that suppliers with fewer customers may face greater sales difficulties after the shock, leading to higher inventory and financial pressures. We divide the treated sample into two groups based on the median number of customers: suppliers with fewer customers than the median are classified as the high-vulnerability group, while those with more customers than the median are classified as the low-vulnerability group.

The results are presented in Table 6. Intuitively, High-vulnerability suppliers are the primary targets of the sanctions. These suppliers are unable to alleviate inventory pressures through a diversified customer base after the shock. However, surprisingly,

the sanctions do not seem to lead to the deterioration in sales and cash flow as mentioned by Dhaliwal et al. (2016). We speculate that the supply chain shock may cause a significant increase in demand for substitutes to the controlled products of the sanctioned firms. Consequently, suppliers outside the U.S. expand their sales to these firms. We further discuss this in Section 5.

5 Analysis from the Supply Chain Perspective

5.1 Supply Chain Disruption and Establishment

5.1.1 Adjustment or Reconfiguration?

After presenting the impact of sanctions on suppliers' performance, this section discusses the potential mechanisms behind these effects. In Section 4.3, we find that sanctions significantly increase suppliers' inventory in the short term while also boosting their sales and profitability. Section 4.4 further reveals that this short-term impact is particularly pronounced among Chinese suppliers, with high-vulnerability suppliers experiencing more improvements in sales and profitability. We attempt to explain this phenomenon from the perspective of supply chain disruption and establishment: the sanctions disrupt the supply chains of the sanctioned firms, leading to a significant increase in their demand for domestic substitutes for tech products, which in turn creates growth opportunities for Chinese suppliers.

To test this hypothesis, we analyze the impact of sanctions on supply chain relationships by comparing the likelihood of a supplier terminating or establishing the relations with the sanctioned firms to the likelihood of terminating or establishing the relations with another Chinese tech firm. We estimate this using a relationship-level specification:

$$Y_{ijgt} = \alpha + \beta Entity_{ijt} + \theta_{ij} + \delta_{it} + \varphi_{jt} + \omega_{gt} + \varepsilon_{ijgt} \tag{3}$$

where i denotes a supplier, j denotes its customer, t denotes a year-quarter. g denotes the peer group of supplier i, an NACE2 industry-country-size quartile combination. Y_{ijgt} is one of the supply chain adjustments variables, including supply chain disruption ($Disrup$) and establishment ($Estab$), which equals one if a supply chain relationship between supplier i and its customer j disrupts or establishes at time t. We consider a supply chain relationship disrupts at time t if it exists up until t but does not continue in subsequent periods. Similarly, we define a supply chain rela-

tionship as newly establish at time t if it never exists before but is established for the first time at time t. $Entity_{ijt}$ equals one if the customer j of supplier i is included on *Entity List* at time t. In Equation 3, we include supply chain relationship fixed effects θ_{ij}, along with firm-level fixed effects δ_{it} and φ_{jt}, to control for the impact of changes in firm performance. Corresponding to the baseline specification, suppliers' peer group fixed effects ω_{gt} is also included. Coefficient β reflects the likelihood that a supplier terminates the relations with the sanctioned firms relative to the likelihood of terminating one with another Chinese tech firm.

The results in Table 7 show that the sanctions primarily lead to supply chain adjustments, rather than a complete reconfiguration. In columns (1) and (5), the coefficient β is statistically significant at the 1% level, indicating that the sanctions do not disrupt global supply chains. Instead, they reduce the probability of disruption in suppliers' relations with the sanctioned firms and increased the likelihood of establishing new relations, which may seem counterintuitive. When we further distinguish suppliers by country, we observe that the sanctions have minimal impact on suppliers from the U.S. and other third countries, whereas Chinese suppliers are more likely to maintain or establish new supply chain relationships with the sanctioned firms, which reflects a trend of supply chain localization. These results support our initial hypothesis and help explain the results from the baseline tests.

The absence of significant decoupling in the China-U.S. supply chain may be attributed to the nature of the sanctions only targeting controlled technology products, such as high-end chips. Although these sanctions limit access to advanced products, they do not prevent sanctioned firms from sourcing lower-sensitivity products, which helps mitigate the impact on U.S. industry revenues and profitability.[13][14] For instance, Huawei highly relies on high-end chips from Qualcomm, Intel, and TSMC for its 5G technology and smartphone business. After its addition to *Entity List*, these companies were unable to supply Huawei with advanced chips (10 nanometers and below), which severely damaged Huawei's 5G and smartphone business. Nonetheless, Huawei can still obtain low-sensitivity products, such as 28nm low-end chips for traditional communication devices, from U.S. suppliers. In response to the sanctions, Huawei accelerated its supply chain localization efforts, by increasing its focus on independent research and sought collaborations with Chinese chip manufacturers to

[13]See https://www.csis.org/analysis/understanding-biden-administrations-updated-export-controls.

[14]We can see in Section 6.2.1 that the revenues and profits of U.S. downstream firms instead rise post-sanctions.

promote the production of domestic high-end chips (Tse et al., 2024). In total, as noted by Freund et al. (2024), although U.S. trade policies have led to some degree of decoupling in China-U.S. trade, but supply chains still remain intertwined with China.

5.1.2 Indirect Business by Subsidiaries

Sanctioned firms can mitigate the impact of sanctions by establishing indirect business relationships overseas (Duong et al., 2024). In our story, the sanctioned firms may use subsidiaries to diversify their operations or maintain imports, thereby reducing the overall impact of the sanctions. One approach is for firms to restructure by separating sensitive and non-sensitive operations, offloading less sensitive activities to subsidiaries, which helps minimize the sanctions' effects. For instance, after facing sanctions, Huawei transferred a significant portion of its smartphone business to its subsidiary Honor, enabling Honor to continue procuring U.S. technology and components, while Huawei focused on high-end markets and R&D. Subsidiaries can also serve as intermediaries, importing sanctioned products or technologies from third-party countries or suppliers, and then reselling them to the parent company.

To test this, we use the variable $Estab_{SUB}$, which equals one if a supplier establishes a supply chain relationship with a non-sanctioned subsidiary of the sanctioned firms, as the dependent variable. The result in column (1) of Table 8 shows that the coefficient for $Entity_{ijt}$ is positive and statistically significant at the 1% level, implying that after sanctions, suppliers notably increase their business ties with the subsidiaries of the sanctioned firms, thereby supporting our hypothesis.

5.1.3 Nationalism and Technology Endorsement Effect

When firms experience shocks, nationalism can play a significant role in shaping their operations and strategic decisions, particularly in the context of the U.S.-China trade war (Fisman et al., 2014). Moreover, being placed on *Entity List* signals that the BIS views the firm's technology as a potential challenge to U.S. technological leadership, which can be interpreted as a form of technology endorsement. This, in turn, may enhance the sanctioned firm's reputation domestically.

In this regard, we argue that U.S. sanctions may, in fact, elevate the reputation of Chinese tech firms both in terms of nationalism and technological prowess. Huawei serves as a prime example, as U.S. sanctions transformed the company into a sym-

bol of China's technological independence and national resurgence.[15] As a result, Chinese suppliers may voluntarily choose to support these domestic tech firms and establish partnerships with them. We believe that this effect is more pronounced among suppliers with no ties to the U.S., as they are not directly influenced by U.S. trade policies and are more likely to embrace the growing national sentiment.

We replace the dependent variable with the variable $Estab_{CN}$, which equals one if a Chinese supplier establishes a supply relation with the sanctioned firms. Columns (2) to (5) of Table 8 present the results. We divide the treated group into two subsets based on whether the Chinese suppliers have revenue from the U.S. market or have U.S. shareholders. The results in columns (3) and (5) indicate that Chinese suppliers without ties to the U.S. are more likely to establish partnerships with the sanctioned firms after the sanctions, providing indirect support for the nationalism and technology endorsement effects.

5.2 Self-Salvation or Government Intervention

In Section 5.1, we discussed that following the sanctions, the increased demand for domestic alternatives from the sanctioned firms leads to the establishment of supply chain relationships with domestic suppliers. Furthermore, Chinese suppliers are more likely to form relations with these firms, a trend likely driven by nationalism or technology endorsement effects. Building on this, another question we are interested in is whether this process is driven by the firms themselves, or if there is a role for government guidance.

To answer this question, we examine the differentiated response of Chinese suppliers to the sanctioned firms with political connections versus those without. Specifically, we modify the specification in Section 5.1. To incorporate the political connections of the sanctioned firms into the Equation 3, we remove the fixed effects φ_{jt} and include the same control variables for firm performance as in the baseline specification. We also replace the dependent variable with the variable $Estab_{CN}$ mentioned earlier, then divide the treated group into two subgroups based on whether the sanctioned firms are state-owned enterprises (SOE) or government suppliers. Data for this analysis is sourced from the CSMAR database and the China Government Procurement website, which publishes procurement contracts detailing the names, addresses, and contact information of both purchasers and successful bidders, along with spe-

[15] See https://www.nytimes.com/2023/03/31/business/huawei-annual-earnings-2022.html.

cific procurement project details.[16] This data is commonly used in studies examining government-enterprise relations in China (Wei et al., 2025).

The results in columns (1) and (3) of Table 9 show that after being placed on *Entity List*, SOE and government suppliers are more likely to find domestic substitute suppliers. This suggests that the government plays a role in the localization of the supply chain, with firms more closely linked to the government being better positioned to recover from the supply chain disruptions caused by sanctions. This could also be due to Chinese suppliers seeking political resources by establishing partnership with the government-affiliated sanctioned firms.

6 Downstream Propagation of the Sanctions

6.1 Impact on the Customers' Performance

In the previous sections, we study the response of suppliers when their customers are sanctioned and how the upstream supply chains adjust to these shocks. Naturally, we are now interested in how the sanctions affect downstream supply chains.

To answer this, we apply a specification similar to the baseline model. In this section, the independent variable $Entity_{it}$ equals one if firm i has a supplier included on *Entity List* at time t. Therefore, its coefficient β_1 reflects the difference in the performance of the treated customers and the control firms before and after the imposition of *Entity List*. All other settings remain consistent with the baseline specification.

Table 10 presents the impact of the sanctions on customers. The results show that the sales revenue and profit of the treated customers decline by an average of 8.1% ($e^{-0.0841} - 1$) and 8.4% ($e^{-0.0881} - 1$) after the sanctions, respectively, compared with the control firms. However, there is no significant impact on the inventory. The absence of inventory buildup shows that the demand side of the customers is not affected by the sanctions, and their products continue to be sold without issue. We prefer the explanation that the sanctions affect the supply side of the customers, leading to a decline in sales and profits due to shortages of upstream products.

The sanctions have opposing effects on upstream and downstream firms. Upstream firms benefit from the supply chain adjustments caused by the sanctions, gaining additional economic benefits. In contrast, downstream firms experience reduced profits due to shortages in raw materials or intermediate products. Existing

[16] See https://www.ccgp.gov.cn/.

literature has well documented the asymmetric effects of shocks on the supply chain. Alfaro et al. (2021) shows that bank credit supply shocks have stronger downstream propagation effects than the upstream, due to the reduction in trade credit and the price adjustments. Crosignani et al. (2023) empirically finds that the negative impact of cyberattacks is transmitted downstream to firms in the supply chain, but the effect on upstream firms is not significant.

We also plot the event study graph. Figure 6 demonstrates that the coefficient changes prior to the sanctions do not show any clear pre-trend. After the sanctions, when the dependent variable is inventory ($Stock$), there is no significant upward or downward trend in the treatment effect, implying that the sanctions do not cause a noticeable difference in inventory changes between the treated customers and the others firms. However, when the dependent variables are sales revenue ($Sales$) and gross profit ($Profit$), the treatment effect shows a clear downward trend, which persists throughout the sample period. This indicates that the sanctions have had a lasting negative impact on the sales and profits of the treated customers, highlighting the disruption to their supply chains due to shortages in upstream products.

6.2 Heterogeneity of Customers

6.2.1 Customers' Countries

The sanctions can disrupt the supply chain between Chinese and U.S. firms, as we demonstrated in Section 4.4.1, where both Chinese and U.S. suppliers are affected by the indirect effects of the sanctions. In this section, we further examine the heterogeneity of the customer's countries. We classify the treated customers into three groups: China, the U.S., and third countries. The results in Table 11 show that the effect on sales and profits differs across these groups. Specifically, for customers in China, the coefficients in columns (4) and (7) exhibit a negative impact, while the coefficients for U.S. customers in columns (5) and (8) show a positive impact, with both effects being statistically significant. In contrast, the coefficients for customers in third countries are not statistically significant.

For Chinese customers, the sanctions on their suppliers lead to shortages of upstream products, negatively affecting their operations. In contrast, U.S. customers benefit from the sanctions on Chinese suppliers, suggesting that these suppliers are not essential and can be replaced by U.S. firms. Their Chinese counterparts are struggling with the sanctions, which in turn gives them a competitive advantage in the

downstream markets. This also proves that minimizing the impact on the revenue and profitability of U.S. industry is a prerequisite for *Entity List*. Additionally, only third-country customers are impacted by the sanctions in terms of inventory, likely due to the increased market power of U.S. firms, which puts significant competitive pressure on these customers. However, as shown in columns (6) and (9), this pressure is not enough to notably affect their profitability.

6.2.2 Vulnerability of Customers' Supply Chain

Firms rely on a variety of intermediate inputs and services from different suppliers in their production function, which makes them more vulnerable to disruptions, especially when their suppliers cannot be easily replaced (Elliott et al., 2022). Thus, following the Section 4.4.2, we hypothesize that customers with fewer suppliers are more likely to be affected by the sanctions. We divide the treated group into two subsets based on the median number of suppliers: customers with fewer suppliers are classified as the high-vulnerability group, while those with more suppliers are classified as the low-vulnerability group.

The results in Table 12 support our hypothesis. As shown in columns (4) and (6), the sanctions have a more significant negative impact on customers with fewer suppliers, confirming our hypothesis. These vulnerable customers are unable to mitigate supply-side pressures through a diverse range of suppliers, leading to a deterioration in their performance when facing such shocks.

7 Conclusion

We investigate the impact of the U.S.-China tech competition, one of the most significant technological conflicts of the 21st century, on global supply chains. The U.S. has utilized its *Entity List* as a key tool in tech sanctions, placing several leading Chinese high-tech firms on the list and restricting their access to high-tech products from the U.S., both directly and indirectly. While this technological decoupling has severely impacted these Chinese firms, they have surprisingly shown signs of recovery from the resulting supply chain disruptions. Our findings offer a potential explanation for this recovery. Using detailed data on supply chain relationships and firm financial performance, we estimate the impact of the sanctions on global supply chains. We find that the sanction's impact result in a 12.6% increase in inventory for the affected suppliers, while their sales revenue and profits increase by 9.6% and 10.8%, respec-

tively, which is more pronounced among Chinese suppliers and those with vulnerable supply chains.

We also analyze the impact of the sanctions from a supply chain perspective. Specifically, we show that the sanctions significantly increase the likelihood of Chinese suppliers maintaining and establishing new supply chain relations with sanctioned firms, while having no impact on U.S. or third-country suppliers. This growth is primarily driven by increased domestic substitution demand from sanctioned firms and enhanced reputations linked to nationalism and technological capabilities, with government involvement playing a role. Lastly, we examine the sanctions' effects on downstream firms and find that, while they severely reduce the profitability of Chinese customers, they improve the market competitiveness of U.S. customers.

Our paper suggests that there are no clear winners in the tech war. While the tech sanctions force Chinese firms to localize their supply chains, their foreign suppliers—U.S. tech leaders—do not experience improved performance as a result. As geopolitical dynamics continue to evolve, companies must systematically assess the potential risks of supply chain disruptions and establish comprehensive contingency plans. Furthermore, our findings provide insights into how governments can strategically regulate industrial policies to address the risks of external supply chain decoupling. In conclusion, these trends may have significant long-term implications for global trade, supply chain management, and the role of governments in shaping market dynamics.

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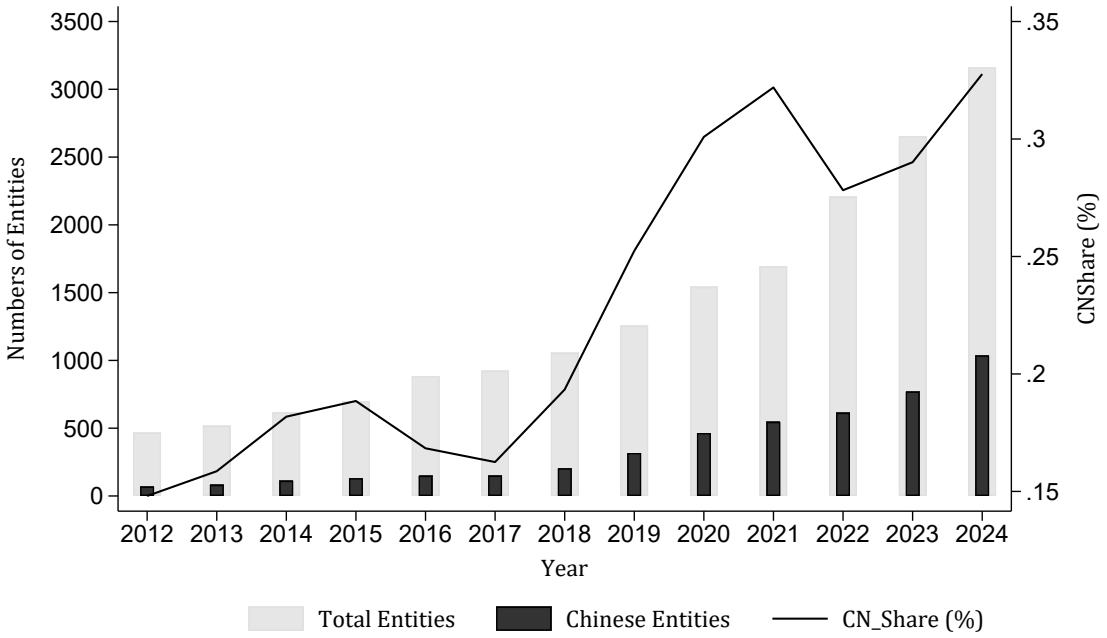
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A Figures and Tables

Figure 1. Chinese Entities on *Entity List*



Notes: This figure plots the trend in the number of entities listed on *Entity List*, highlighting changes in the frequency of Chinese entities' inclusion and their relative share. The bars represent the number of entities, and the solid line shows the trend in the share of Chinese entities. For those appeared multiple times on *Entity List*, we only consider their first inclusion. Source: eCFR.

Table 1. Representative Chinese Firms Included on *Entity List*

Technical Field	Representative Firms
Chips & Semiconductors	Huawei
	SMIC
	HiSilicon
	Phytium
AI & Machine Learning	SenseTime
	Megvii
	iFLYTEK
Cybersecurity	CETC Cyberspace
	Qihoo 360
IoT	Hikvision
	Dahua
Supercomputers	China's National Supercomputing Centers
Drones	DJI
Quantum	QuantumCTek

Notes: This table lists in a selection of representative firms that are included on *Entity List*. We select these representative tech leaders based on their size and popularity. The complete list of sanctioned firms covered in this paper is shown in Table B1. Source: eCFR.

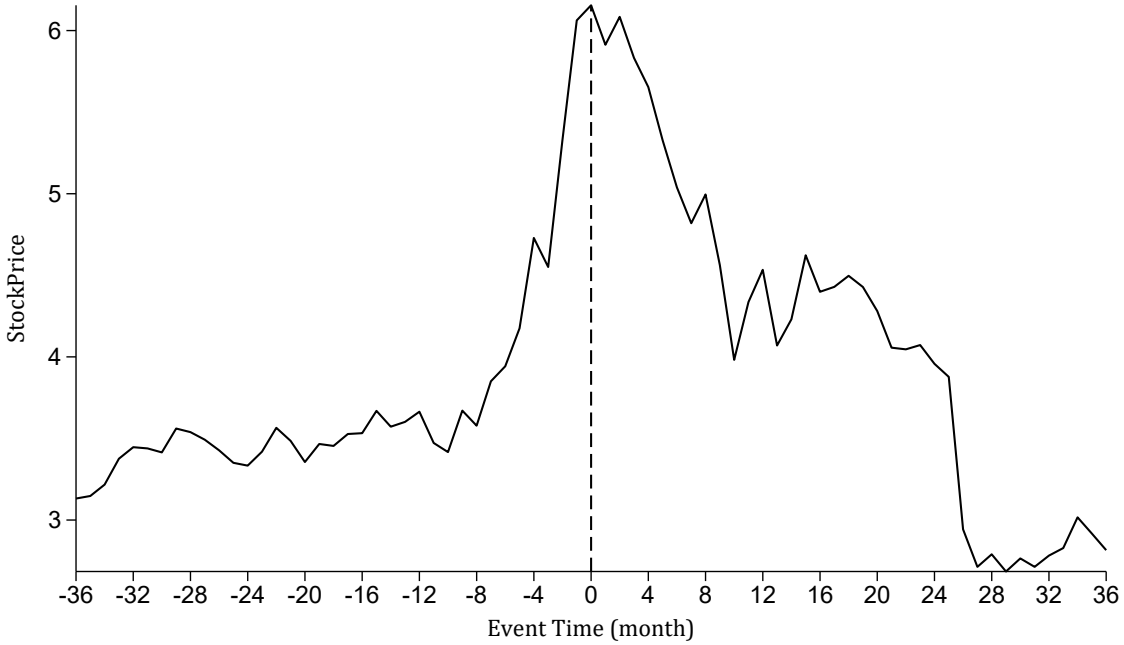
Table 2. Summary Statistics

Panel A: Full Sample								
Variable	N	Mean	STD	P25	P50	P75	Min	Max
$lnAssets$	35328	13.23	1.92	12.04	13.07	14.36	2.80	19.89
$lnAge$	35399	3.08	0.66	2.77	3.09	3.40	0.00	5.83
$lnStock$	30788	10.55	2.32	9.45	10.70	11.96	-1.87	17.99
$lnSales$	35130	11.79	2.06	10.55	11.74	13.05	-2.21	19.72
$lnProfit$	33890	10.71	2.05	9.48	10.61	11.89	-4.61	17.95
ROA	35262	1.28	6.08	-0.13	1.56	3.78	-28.20	17.49
L/A	35252	0.47	0.25	0.28	0.45	0.63	0.05	1.45
$Intang$	32985	0.29	0.28	0.06	0.17	0.50	0.00	0.95

Panel B: Treated vs. Control								
Variable	Treated				Control			
	N	Mean	STD	P50	N	Mean	STD	P50
$lnAssets$	11090	13.23	1.59	13.13	24238	13.23	2.05	13.03
$lnAge$	11085	3.01	0.54	3.04	24314	3.11	0.70	3.14
$lnStock$	10274	10.75	2.07	10.90	20514	10.45	2.43	10.58
$lnSales$	11067	11.71	1.78	11.69	24063	11.84	2.18	11.77
$lnProfit$	10776	10.58	1.72	10.50	23114	10.77	2.18	10.67
ROA	11076	1.76	4.98	1.63	24186	1.06	6.51	1.53
L/A	11080	0.42	0.21	0.41	24172	0.49	0.26	0.48
$Intang$	10621	0.26	0.26	0.15	22364	0.30	0.29	0.19

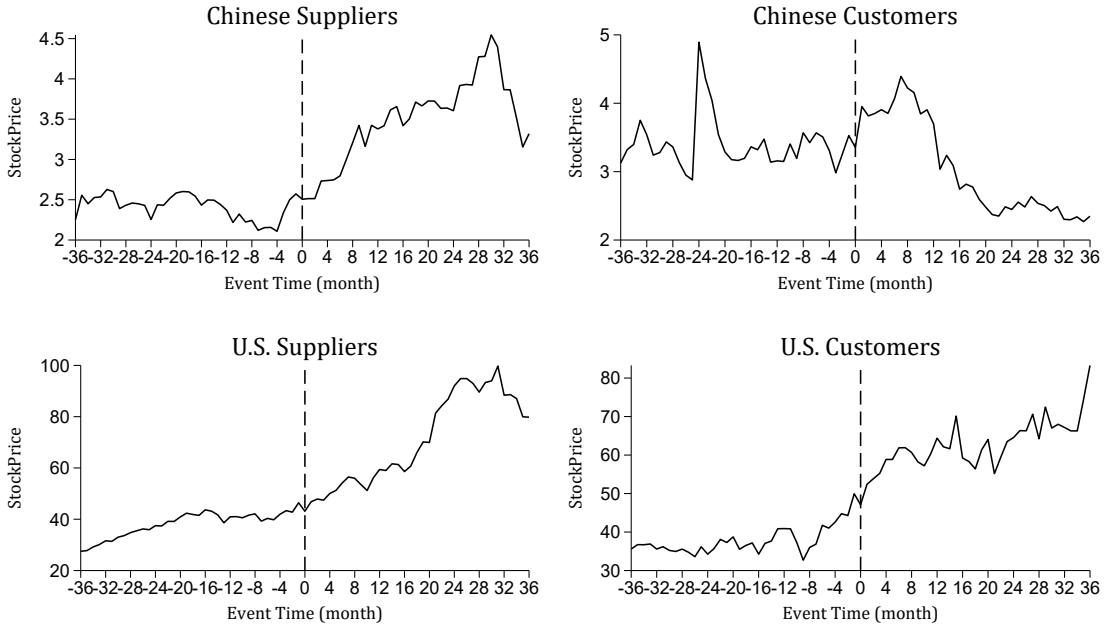
Notes: This table presents summary statistics of our sample firms. The sample period spans from 2016:Q4 to 2023:Q2. Panel A presents the summary statistics for the full sample, while Panel B compares the affected firms (treated group) and unaffected firms (control group). Treated firms are suppliers of the sanctioned firms. Control firms are suppliers and customers who have high-tech products supply relationships with those non-sanctioned Chinese tech firms. $lnAssets$ is firms' total assets (in logarithm). $lnAge$ is firms' age (in logarithm). $lnStock$ is net stated inventory (in logarithm). $lnSales$ is net sales (in logarithm). $lnProfit$ is gross profit (in logarithm). ROA is 100*(earnings before tax/total assets). L/A is the ratio of total liabilities to total assets. $Intang$ is the proportion of intangible fixed assets in fixed assets. Source: BvD Osiris.

Figure 2. Stock Price of the Sanctioned Firms



Notes: This figure plots the changes in stock prices for Chinese tech leaders directly affected by the *Entity List* over a 72-month period—covering both the pre- and post-sanction phases. We standardize the timing of sanctions across firms by measuring the time relative to the sanction event, and then average their stock prices accordingly. The solid line shows the trend in the average stock price of the sanctioned firms. Source: CSMAR.

Figure 3. Stock Price of the Suppliers and Customers



Notes: This figure presents the average stock price trends for Chinese and U.S. suppliers and customers over a 72-month period centered on the sanction event. Stock prices are averaged based on their timing relative to the sanction. The solid line shows the trend in the average stock price of these suppliers and customers. Source: CSMAR.

Table 3. Baseline Test Results

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	*lnStock*		*lnSales*		*lnProfit*	
Entity	0.1121**	0.1191**	0.0954**	0.0914**	0.1023**	0.1023***
	(0.0552)	(0.0596)	(0.0394)	(0.0387)	(0.0407)	(0.0376)
lnAge		0.3940***		0.2680**		0.2406**
		(0.1442)		(0.1163)		(0.1164)
ROA		0.0094***		0.0349***		0.0538***
		(0.0028)		(0.0032)		(0.0050)
L/A		0.3376		0.3452		0.0977
		(0.2873)		(0.2263)		(0.1915)
Intang		0.7235***		0.8089***		0.8075***
		(0.1211)		(0.0973)		(0.0944)
Firm FE	YES	YES	YES	YES	YES	YES
Industry-Country-Size Quartile-Year Quarter FE	YES	YES	YES	YES	YES	YES
R-squared	0.9535	0.9556	0.9663	0.9722	0.9571	0.9647
Observations	22642	21481	25903	24135	25055	23377

Notes: This table presents results from Equation 1, which imply the impact of sanctions on suppliers' performance. The sample period is from 2016Q4 to 2023Q2. The independent variable $Entity_{it}$ is an indicator equals one if firm i has a customer included on *Entity List* at time t. Treated firms are suppliers of the sanctioned firms. Control firms are suppliers and customers who have high-tech products supply relationships with those non-sanctioned Chinese tech firms. The coefficient of $Entity_{it}$ reflects the difference in the performance of the treated suppliers and the control firms before and after the imposition of *Entity List*. The dependent variable for columns (1) and (2) is net stated inventory (in logarithm); the dependent variable for columns (3) and (4) is sales revenue (in logarithm); the dependent variable for columns (5) and (6) is gross profit (in logarithm). Control variables are firms' age in logarithm ($lnAge$), return on assets (ROA), the ratio of liabilities to total assets (L/A), the ratio of intangible assets to fixed assets ($Intang$). We also include firm fixed effects to control for unobservable time-invariant firm characteristics, and industry-country-size quartile-year quarter fixed effects to control for time-varying shocks at the industry, country, and macroeconomic levels (e.g., COVID-19 and the Trump tariffs in the U.S.-China trade war) that may affect firms of different sizes. Standard errors are clustered at the country-industry level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4. Placebo Test Results

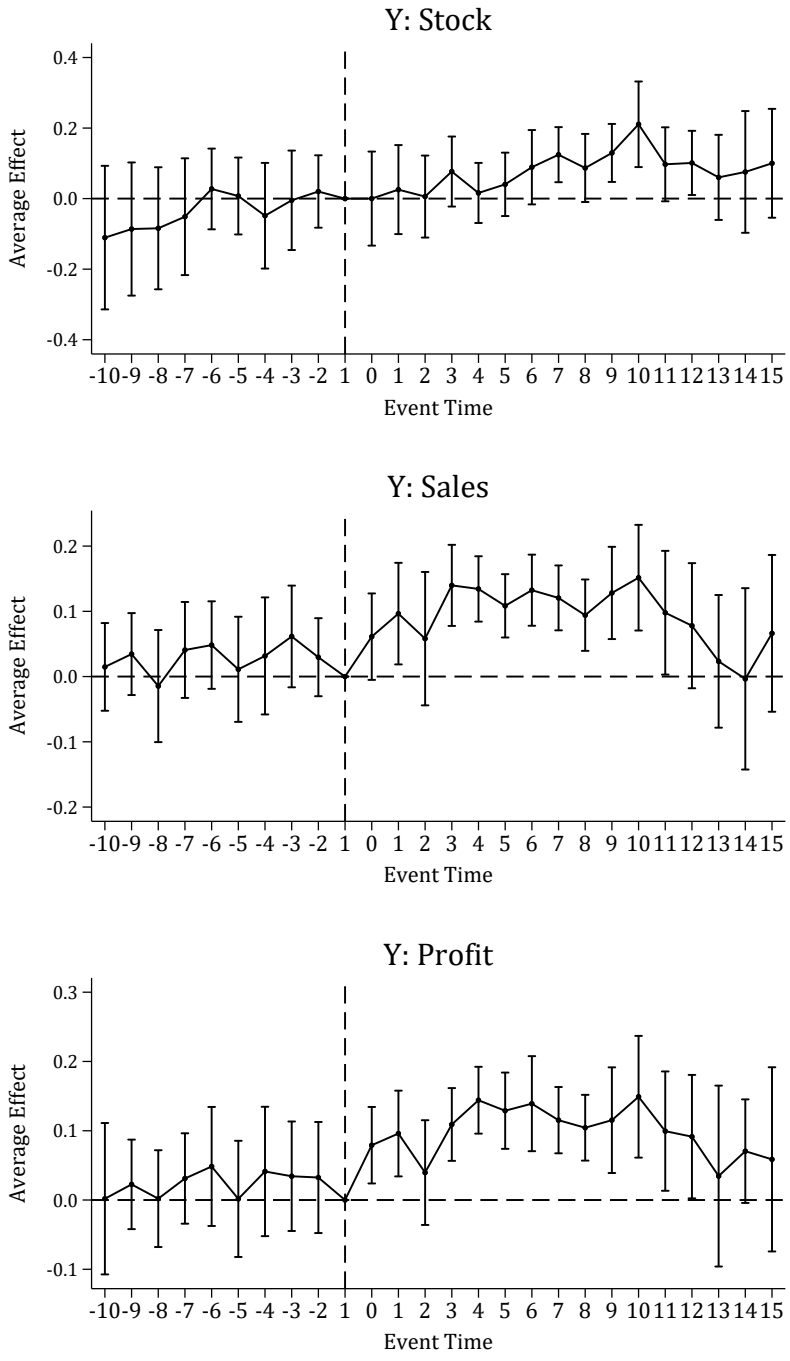
	(1)	(2)	(3)
	Placebo Test: Suppliers of Similar Firms		
Variables	$lnStock$	$lnSales$	$lnProfit$
Entity	0.0226	0.0086	-0.0219
	(0.0370)	(0.0274)	(0.0242)
Controls	YES	YES	YES
Firm FE	YES	YES	YES
Industry-Country-Size Quartile-Year Quarter FE	YES	YES	YES
R-squared	0.9725	0.9709	0.9643
Observations	51504	62525	60882

Notes: This table presents how suppliers of similar firms respond to the sanctions. We identify similar firms based on whether they maintain a "competitor" relationship with the sanctioned firms. The sample consists of two groups: the suppliers of similar firms and a peer group of these suppliers. The treated group consists of suppliers of the similar firms with Chinese competitors that have been sanctioned, while the control group comprises the peer group of these suppliers. Specifically, the specification is as follows:

$$Y_{sgt} = \alpha + \beta_1 Entity_{st} + \beta_2 Control_{st} + \delta_s + \omega_{gt} + \varepsilon_{sgt} \tag{4}$$

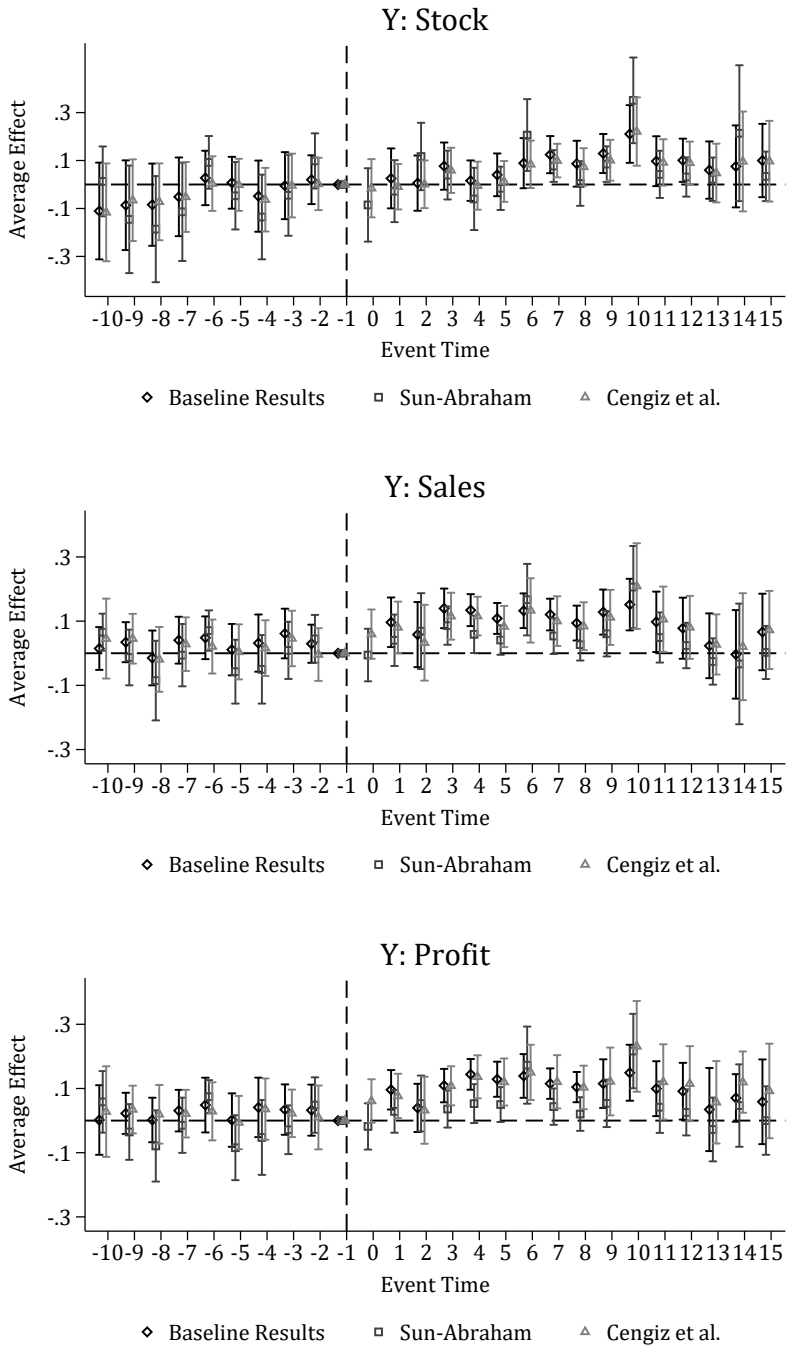
where s denotes the sample firms.The independent variable $Entity_{st}$ is an indicator equals one if the customer of supplier s has a Chinese competitor included on *Entity List* at time t. The dependent variable Y_{sgt} is the performance indicator of supplier s, including inventory ($lnStock$), sales revenue ($lnSales$) and gross profit ($lnProfit$). Control variables are consistent with Equation 1. Firm fixed effects and industry-country-size quartile-year quarter fixed effects are also included. Standard errors are clustered at the country-industry level. We obtain the "competitor" relationship data from Factset. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Figure 4. Event Study Results



Notes: This figure shows the event-study plots for Equation 2. To avoid the influence of extreme values on the treatment effect, we set the preperiods to 10 and the postperiods to 15, thereby excluding about 5% of the extreme samples. The bars represent 95 percent confidence intervals. Standard errors are clustered at the country-industry level.

Figure 5. Event Study Using the Robust Estimators



Notes: This figure overlays the event-study plots constructed using three different estimators: a dynamic version of the baseline model, estimated using OLS (diamond markers); Sun and Abraham (2021) (square markers); Cengiz et al. (2019) (triangle markers). The preperiods and postperiods of the robust estimators are consistent with the specification in Figure 4. The bars represent 95 percent confidence intervals. Standard errors are clustered at the country-industry level.

Table 5. Heterogeneity of Suppliers' Countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	lnStock			*lnSales*			*lnProfit*		
Variables	CN	US	THIRD	CN	US	THIRD	CN	US	THIRD
Entity	0.1626*	0.1668***	-0.0370	0.1352**	0.0331	0.0111	0.1357**	0.0310	0.0574
	(0.0861)	(0.0328)	(0.0888)	(0.0597)	(0.0698)	(0.0570)	(0.0585)	(0.0614)	(0.0475)
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry-Country-Size Quartile-Year Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
R-squared	0.9532	0.9676	0.9661	0.9713	0.9793	0.9794	0.9632	0.9734	0.9727
Observations	18922	13279	13730	21152	15516	15935	20549	14968	15232

Notes: This table shows the heterogeneous impact of sanctions on suppliers from different countries. Using supplier country data from Factset, we classify the treated suppliers into Chinese suppliers (including Hong Kong and Macau, but excluding Chinese Taiwan), U.S. suppliers, and third-country suppliers (all other countries excluding China and the U.S.). To maintain comparability across groups, the control group in all regressions remain consistent with the baseline model. Independent variables, dependent variables, control variables, and fixed effects are also the same as in the Equation 1. Columns (1), (4), and (7) present the estimation results for Chinese suppliers. Columns (2), (5), and (8) show the results for U.S. suppliers, while columns (3), (6), and (9) display the results for third-country suppliers. Standard errors are clustered at the country-industry level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6. Heterogeneity of Supply Chain Vulnerability

	(1)	(2)	(3)	(4)	(5)	(6)
	lnStock		*lnSales*		*lnProfit*	
Variables	LOW	HIGH	LOW	HIGH	LOW	HIGH
Entity	-0.0660	0.1748**	-0.0321	0.1210**	-0.0624	0.1465***
	(0.0774)	(0.0838)	(0.0528)	(0.0557)	(0.0563)	(0.0561)
Controls	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES
Industry-Country-Size Quartile-Year Quarter FE	YES	YES	YES	YES	YES	YES
R-squared	0.9659	0.9564	0.9782	0.9735	0.9715	0.9659
Observations	14632	19161	16930	21529	16292	20847

Notes: This table presents the heterogeneous impact of sanctions on suppliers with different levels of supply chain vulnerability. We divide the treated suppliers into two groups based on the median number of customers: suppliers with fewer customers than the median are classified as the high-vulnerability group, while those with more customers than the median are classified as the low-vulnerability group. To maintain comparability across groups, the control group in all regressions remain consistent with the baseline specification. Independent variables, dependent variables, control variables, and fixed effects are also the same as in the Equation 1. Columns (1), (3), and (5) present the estimation results for low-vulnerability suppliers. Columns (2), (4), and (6) show the results for high-vulnerability suppliers. Standard errors are clustered at the country-industry level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 7. Disruption and Establishment of Supply Chain Relations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Disrup				*Estab*			
Variables	TOTAL	CN	US	THIRD	TOTAL	CN	US	THIRD
Entity	-0.0965***	-0.0960***	-0.0004	-0.0001	0.0601***	0.0598***	-0.0010	0.0013
	(0.0030)	(0.0029)	(0.0006)	(0.0006)	(0.0039)	(0.0038)	(0.0007)	(0.0017)
Relationship FE	YES	YES	YES	YES	YES	YES	YES	YES
Supplier-Year Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES
Customer-Year Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry-Country-Size Quartile-Year Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES
R-squared	0.6011	0.5879	0.5470	0.6663	0.6568	0.6595	0.5477	0.6861
Observations	138618	138618	138618	138618	138618	138618	138618	138618

Notes: This table shows the results of the impact of sanctions on the upstream supply chain, from Equation 3. The independent variable $Entity_{ijt}$ equals one if the customer j of supplier i is included on *Entity List* at time t. The dependent variables are *Disrup* and *Estab*, which equal one if a supply chain relationship between supplier i and its customer j disrupts or establishes at time t. Specifically, we consider a supply chain relationship disrupts at time t if it exists up until t but does not continue in subsequent periods. Similarly, we define a supply chain relationship as newly establish at time t if it never exists before but is established for the first time at time t. The treated group consist of supply chain relations affected by sanctions, while the control group comprise those not affected. The coefficient of $Entity_{ijt}$ represents the difference in the likelihood of a supplier either terminating or establishing a relationship with the sanctioned firms, compared to the likelihood of doing so with another Chinese tech firm. We include relationship fixed effects θ_{ij}, along with firm-level fixed effects δ_{it}, φ_{jt}, and supplier industry-country-size quartile-year quarter effects ω_{gt}. Columns (1) and (5) show the estimation results for the full sample. We classify the treated relations into three subsets by their suppliers' countries. Columns (2) and (6) present the results for relations with Chinese suppliers. Columns (3) and (7) show the results for relations with U.S. suppliers, while columns (4) and (8) display the results for relations with third-country suppliers. Standard errors are clustered at the supplier country-industry level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 8. Results of Section 5.1.2 and 5.1.3

Variables	(1)	(2)	(3)	(4)	(5)
	$Estab_{SUB}$	$Estab_{CN}$			
		U.S. Income	No U.S. Income	U.S. Holder	No U.S. Holder
Entity	0.0589***	0.0005	0.0593***	-0.0014	0.0613***
	(0.0001)	(0.0024)	(0.0025)	(0.0016)	(0.0033)
Relationship FE	YES	YES	YES	YES	YES
Supplier-Year Quarter FE	YES	YES	YES	YES	YES
Customer-Year Quarter FE	YES	YES	YES	YES	YES
Industry-Country-Size Quartile-Year Quarter FE	YES	YES	YES	YES	YES
R-squared	0.4128	0.6819	0.6297	0.5764	0.6796
Observations	138618	138618	138618	138618	138618

Notes: This table presents the results of Section 5.1.2 and Section 5.1.3. Column (1) shows the impact of sanctions on the supply chain relations of sanctioned firms' subsidiaries. The dependent variable $Estab_{SUB}$ equals one if a supplier establishes a supply chain relationship with a non-sanctioned subsidiary of the sanctioned firms. Columns (2)-(5) show whether the likelihood of Chinese suppliers establishing supply relationships with sanctioned firms after the sanctions is related to suppliers' connections with the U.S. market. The dependent variable $Estab_{CN}$ equals one if a Chinese supplier establishes a supply relation with the sanctioned firms. We divide the treated group into two subsets based on whether the Chinese suppliers have revenue from the U.S. market or have U.S. shareholders. Columns (2) and (3) show the results for whether suppliers have revenue from the U.S. market. Columns (4) and (5) present the results for whether suppliers have U.S. shareholders. Standard errors are clustered at the supplier country-industry level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 9. Self-Salvation or Government Intervention

Variables	(1)	(2)	(3)	(4)
	$Estab_{CN}$			
	SOE	Non-SOE	Gov Suppliers	Non-Gov Suppliers
Entity	0.0129***	-0.0178	0.0130***	-0.0174
	(0.0049)	(0.0180)	(0.0049)	(0.0175)
Customer Controls	YES	YES	YES	YES
Relationship FE	YES	YES	YES	YES
Supplier-Year Quarter FE	YES	YES	YES	YES
Industry-Country-Size Quartile-Year Quarter FE	YES	YES	YES	YES
R-squared	0.6684	0.6710	0.6684	0.6710
Observations	39302	37677	39286	37703

Notes: This table shows the differentiated response of Chinese suppliers to the sanctioned firms with political connections versus those without. Specifically, we examine the following specification:

$$Y_{ijgt} = \alpha + \beta_1 Entity_{ijt} + \beta_2 Control_{jt} + \theta_{ij} + \delta_{it} + \omega_{gt} + \varepsilon_{ijgt} \tag{5}$$

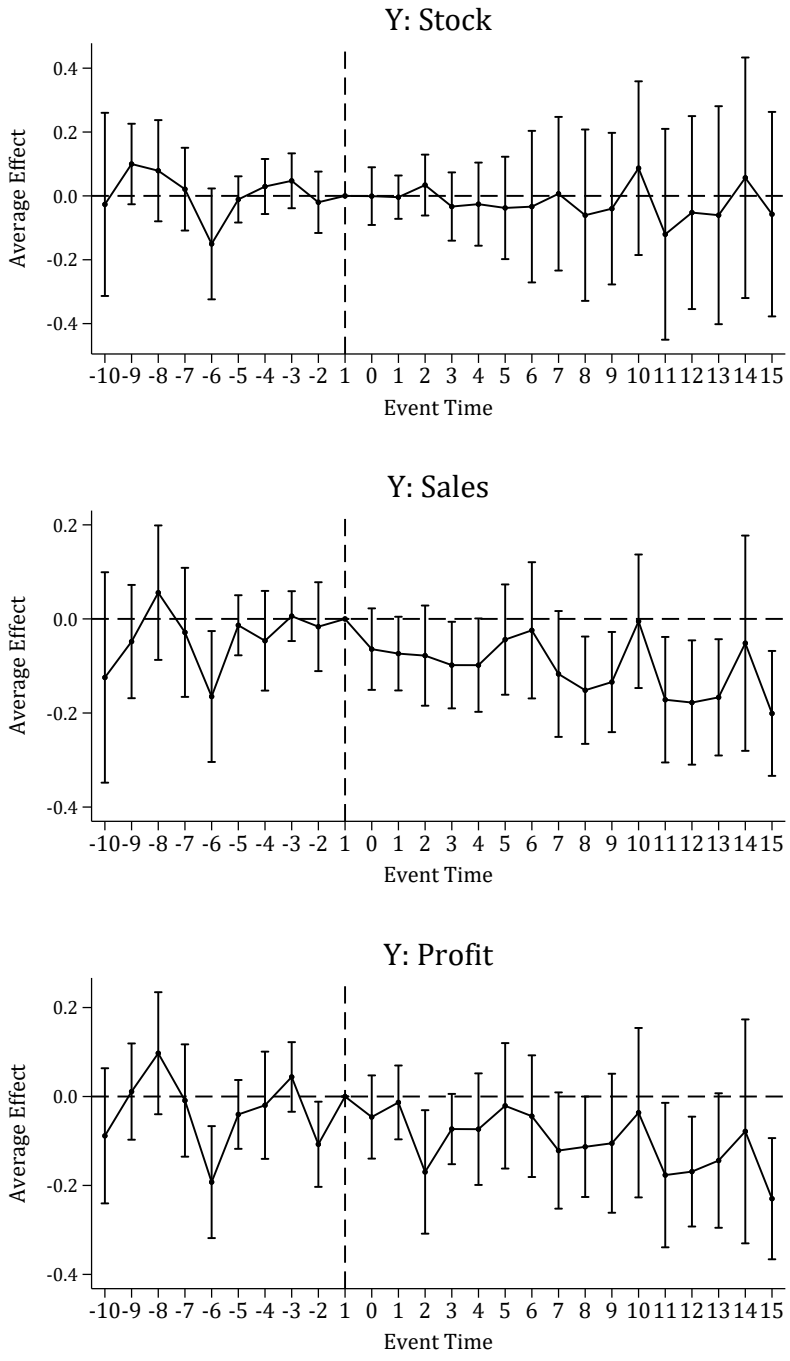
Compared to Equation 3, we remove the firm fixed effects φ_{jt} and control for performance variables of sanctioned firm j, including firms' age ($lnAge$), return on assets (ROA), the ratio of liabilities to total assets (L/A) and the ratio of intangible assets to fixed assets ($Intang$). The dependent variable $Estab_{CN}$ equals one if a Chinese supplier establishes a supply relation with the sanctioned firms. We divide the treated group into two subgroups based on whether the sanctioned firms are state-owned enterprises (SOE) or government suppliers. Columns (1) and (3) show the results for supply relationships with government connections, including cases where the customers (i.e., sanctioned firms) are SOE or government suppliers. Columns (2) and (4) present the results for those with no connections. Data for this analysis is sourced from the CSMAR database and the China Government Procurement website. Standard errors are clustered at the supplier country-industry level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 10. Downstream Propagation of the Sanctions

Variables	(1) $lnStock$	(2) $lnSales$	(3) $lnProfit$
$Entity$	-0.0478	-0.0841*	-0.0881**
	(0.0843)	(0.0431)	(0.0441)
Controls	YES	YES	YES
Firm FE	YES	YES	YES
Industry-Country-Size Quartile-Year Quarter FE	YES	YES	YES
R-squared	0.9555	0.9721	0.9646
Observations	21481	24135	23377

Notes: This table shows the impact of sanctions on downstream customers. The independent variable $Entity_{it}$ equals one if firm i has a supplier included on *Entity List* at time t. Treated firms are customers of the sanctioned firms. Control firms are suppliers and customers who have high-tech products supply relationships with those non-sanctioned Chinese tech firms. Therefore, the key coefficient reflects the difference in the performance of the treated customers and the control firms before and after the imposition of *Entity List*. Control variables are consistent with Equation 1. Firm fixed effects and industry-country-size quartile-year quarter fixed effects are also included. Standard errors are clustered at the country-industry level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Figure 6. Event Study Results for Customers



Notes: This figure shows the event-study analysis for customers. The numbers of preperiods and postperiods are consistent with Equation 2. The bars represent 95 percent confidence intervals. Standard errors are clustered at the country-industry level.

Table 11. Heterogeneity of Customers' Countries

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	lnStock			*lnSales*			*lnProfit*		
Variables	CN	US	THIRD	CN	US	THIRD	CN	US	THIRD
Entity	-0.1636	0.1536	0.1555*	-0.1427***	0.2283***	-0.0265	-0.1762***	0.2140**	0.0423
	(0.1190)	(0.1002)	(0.0816)	(0.0526)	(0.0232)	(0.0575)	(0.0495)	(0.1000)	(0.0562)
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry-Country-Size Quartile-Year Quarter FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
R-squared	0.9538	0.9587	0.9593	0.9699	0.9722	0.9735	0.9617	0.9641	0.9658
Observations	19547	17812	19236	22030	20103	21660	21452	19537	20918

Notes: This table shows the heterogeneous impact of sanctions on customers from different countries. We classify the treated group into Chinese customers (including Hong Kong and Macau, but excluding Chinese Taiwan), U.S. customers, and third-country customers (all other countries excluding China and the U.S.). To maintain comparability across groups, the control group in all regressions remain consistent with the baseline specification. Independent variables, dependent variables, control variables, and fixed effects are also the same as in the Equation 1. Columns (1), (4), and (7) present the estimation results for Chinese customers. Columns (2), (5), and (8) show the results for U.S. customers, while columns (3), (6), and (9) display the results for third-country customers. Standard errors are clustered at the country-industry level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 12. Heterogeneity of Vulnerabilities in Customers' Supply Chains

	(1)	(2)	(3)	(4)	(5)	(6)
	lnStock		*lnSales*		*lnProfit*	
Variables	LOW	HIGH	LOW	HIGH	LOW	HIGH
Entity	0.0340	-0.0796	-0.0909	-0.0869*	-0.0610	-0.1048**
	(0.1634)	(0.0987)	(0.0707)	(0.0467)	(0.0710)	(0.0462)
Controls	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES
Industry-Country-Size Quartile-Year Quarter FE	YES	YES	YES	YES	YES	YES
R-squared	0.9561	0.9573	0.9724	0.9717	0.9651	0.9633
Observations	18911	20022	21279	22639	20665	21939

Notes: This table presents the heterogeneous impact of sanctions on customers with different levels of supply chain vulnerability. We divide the treated group into two subsets based on the median number of suppliers: customers with fewer suppliers are classified as the high-vulnerability group, while those with more suppliers are classified as the low-vulnerability group. The control group in all regressions remain consistent with the baseline specification. Independent variables, dependent variables, control variables, and fixed effects are also the same as in the Equation 1. Columns (1), (3), and (5) present the estimation results for low-vulnerability customers. Columns (2), (4), and (6) show the results for high-vulnerability customers. Standard errors are clustered at the country-industry level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

B Appendix

Appendix Table B1. Chinese Tech Firms on *Entity List*

Firm Name	Firm Name
Anhui Quanta Communication Technology Co.,Ltd.	Huahai Zhihui Technology Co.,Ltd.
Beijing BDStar Navigation Co.,Ltd.	Huawei Technologies Co.,Ltd.
Beijing Leike Defense Technology Co.,Ltd.	Hunan Goke Microelectronics Co.,Ltd.
Beijing Liuhe BGI Co.,Ltd.	Hytera Communications Co., Ltd.
Beijing Sensetime Technology Development Co.,Ltd.	Iflytek Co.,Ltd.
Beijing UniStrong Science&Technology Co.,Ltd.	Inspur Group Co.,Ltd.
Biznest Internet Technology Co.,Ltd.	Shenzhen Intellifusion Technologies Co.,Ltd.
Cambricon Technologies Co.,Ltd.	Hengtong Optic-electric Co.,Ltd.
China Electronics Technology Group Corporation 52nd Research Institute	Kuang-Chi Technologies Co.,Ltd.
CETC Chip Technology Co.,Ltd.	Loongson Technology Co.,Ltd.
Cethik Group Co.,Ltd.	Megvii Technology Limited
Ceyear Technologies Co.,Ltd.	Nanjing Guosheng Electronics Co.,Ltd.
Changsha Jingjia Microelectronics Co.,Ltd.	Nanjing LES Information Technology Co.,Ltd.
Chengdu Huari Communication Technology Co.,Ltd.	Xinhua San Semiconductor Technology Co.,Ltd.
China Electronics Technology Group Corporation 54th Research Institute	Planet Technology Co.,Ltd.
China Electronics Technology Group Corporation 14th Research Institute	Qihoo 360 Technology Co.,Ltd.
China Electronics Technology Group Corporation 41st Research Institute	ROFS Microsystem (Tianjin) Co.,Ltd.
China Electronics Technology Group Corporation 30th Research Institute	Hangzhou Hualan Microelectronics Corp
China Electronics Technology Group Corporation 7th Research Institute	Semiconductor Manufacturing International Corporation

Continued from previous page

Firm Name	Firm Name
China New Era Group Limited	Shaanxi Changling Electronic Technology Co.,Ltd.
CloudWalk Technology Co.,Ltd.	Shanghai Integrated Circuit Research&Development Center Co.,Ltd.
Zhejiang Dahua Technology Co.,Ltd.	Shanghai Microelectronics Equipment Co., Ltd.
Dawning Information Industry Co.,Ltd.	SJ Semiconductor Corporation
DGT Technology Co.,Ltd.	Suzhou Centec Communications Co.,Ltd.
DJI Technology Co.,Ltd.	Tanyuan Technology Co.,Ltd.
Eastech Electronics Limited	Tiandy Technologies Co.,Ltd.
FiberHome Technologies Group	Tianjin 764 Communication Navigation Technology Co.,Ltd.
Fujian Jinhua Integrated Circuit Co.,Ltd.	Tianjin Phytium Information Technology Co.,Ltd.
Hansen Technologies Limited	Tonghui Electronics Co.,Ltd.
Hebei Puxing Electronic Technology Co.,Ltd.	Wuhan Raycus Fiber Laser Technologies Co.,Ltd.
Hefei Bitland Optoelectronic Technology Co.,Ltd.	Xinjiang GCL New Energy Material Technology Co.,Ltd.
Hangzhou Hikvision Digital Technology Co.,Ltd.	Xinjiang Sailing Information Technology Co.,Ltd.
Hisilicon Optoelectronics Co.,Ltd.	Yangtze Memory Technologies Co.,Ltd.
Zhejiang Hesheng Silicon Co.,Ltd.	Zhongtian Technology Submarine Cable Co.,Ltd.

Notes: This table lists the sanctioned firms involved in this study. Source: eCFR.

Appendix Table B2. Summary Statistics, Treated firms (pre-sanctioned) vs. Control firms (first period)

Variables	Treated				Control			
	N	Mean	STD	P50	N	Mean	STD	P50
$lnAssets$	4058	13.05	1.59	13.02	1582	12.79	2.09	12.59
$lnAge$	4061	2.94	0.58	2.94	1601	2.88	0.88	2.94
$lnStock$	3719	10.59	2.06	10.76	1318	10.02	2.47	10.17
$lnSales$	4046	11.55	1.77	11.53	1576	11.28	2.13	11.16
$lnProfit$	3929	10.43	1.72	10.37	1498	10.26	2.11	10.10
ROA	4057	1.76	5.23	1.71	1575	0.75	6.44	1.31
L/A	4055	0.41	0.21	0.39	1579	0.48	0.27	0.45
$Intang$	3844	0.29	0.28	0.18	1436	0.32	0.30	0.21

Notes: This table presents summary statistics for the treated group during pre-sanctioned periods and the control group in the first period, serving to demonstrate the comparability of the two groups before the sanction event. Source: BvD Osiris.

Appendix Table B3. Robustness Test Results

	(1)	(2)	(3)	(4)	(5)	(6)
	Replacement of the Control Group			Excluding *SDN List* and *Unverified List*		
Variables	*lnStock*	*lnSales*	*lnProfit*	*lnStock*	*lnSales*	*lnProfit*
Entity	0.1261**	0.0802**	0.0859**	0.1118*	0.0870**	0.1071***
	(0.0623)	(0.0383)	(0.0376)	(0.0593)	(0.0397)	(0.0381)
Controls	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES
Industry-Country-Size Quartile-Year Quarter FE	YES	YES	YES	YES	YES	YES
R-squared	0.9467	0.9661	0.9576	0.9556	0.9721	0.9651
Observations	16092	18068	17619	20658	23231	22474

Notes: This table presents the results of robustness test. In columns (1)-(3), we refine the control group by excluding the customers of the non-sanctioned Chinese tech firms. In columns (4)-(6), we exclude Chinese firms that are included on *SDN List* and *Unverified List*, along with their suppliers and customers. The rest of this specification is consistent with the baseline test. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Appendix Table B4. Summary Statistics, Sanctioned Firms vs. Similar Firms

Variables	Sanctioned Firms				Similar Firms			
	N	Mean	STD	P50	N	Mean	STD	P50
lnAssets	929	13.64	1.46	13.59	18750	13.32	2.17	13.17
lnAge	929	2.93	0.35	3.00	18746	3.02	0.78	3.09
lnStock	921	11.48	1.65	11.39	15711	10.78	2.48	10.88
lnSales	929	11.75	1.89	11.67	18726	11.84	2.19	11.74
lnProfit	922	10.78	1.79	10.71	18217	10.91	2.16	10.81
ROA	929	0.89	4.21	0.87	18726	1.35	6.17	1.58
L/A	929	0.40	0.21	0.39	18750	0.50	0.26	0.48
Intang	916	0.28	0.23	0.19	17474	0.38	0.30	0.32

Notes: This table presents summary statistics for the sanctioned firms and their similar firms. The sample period is from 2016Q4 to 2023Q2. Source: BvD Osiris.