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The Impact of US-China Trade War on Japanese Multinational Corporations[*]

SUN Chang TAO Zhigang YUAN Hongjie ZHANG Hongyong[†]

Abstract

Using detailed data on Japanese multinational corporations (MNCs), we examine the impact of the US-China trade war on MNC activities and market values. We first use quarterly data on the foreign affiliates of these MNCs and show that, relative to affiliates in other Asian countries, Chinese affiliates, especially those with high exposure to trade with North America (NA), tend to see a decline in sales after the trade war. This decline is largely driven by a drop in sales to third countries. Second, we use data on listed Japanese firms and find that, relative to other listed firms, firms exposed to China-NA trade see a decline in stock prices after Trump proposed tariffs on $50 billion of Chinese imports on Mar 22, 2018. This decline is larger for firms whose Chinese affiliates rely more on inputs from Japan. We see this as evidence that the negative impact of the trade war propagates through the global value chain.

Keywords: trade policy; multinational corporations (MNCs); foreign affiliates; stock returns
JEL classification: F13; F23; G12; G14; O24

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[†] Sun: the University of Hong Kong, sunc@hku.hk. Tao: the University of Hong Kong, ztao@hku.hk. Yuan: the University of Hong Kong, jeffrey.yuan@connect.hku.hk. Zhang: RIETI, zhang-hongyong@rieti.go.jp.

1 Introduction

As a part of the unprecedented backlash against globalization, the Trump administration of the US started "a trade war" against China by proposing tariffs on $50 billion of Chinese imports on March 22, 2018. Targeting on closing the trade deficit and stopping the "forced technology transfer", the US government chooses the weapon of tariffs to force China into an agreement favorable to the US.[1] The literature has investigated the impact of the trade war on the US and China. Amiti et al. (2019) and Fajgelbaum et al. (2019) show that the consumers and producers in the US suffer welfare losses due to soaring prices of intermediates and final goods. Huang et al. (2018) conduct an event study and find that both the US and Chinese firms that depend on US-China trade have lower stock returns in the time window around the announcement of trade war on March 22, 2018. We depart from the literature by examining the impact of the US-China trade war on a third country, Japan. Using detailed data on Japanese multinational corporations (MNCs), we find Japanese firms also see negative effects from the US-China trade war.

The US-China trade war does not only affect the Chinese domestic firms, of which the ownership and production are both in China. In fact, more than 40 percent of China's exports to the world were made by foreign multinational corporations (MNCs) in the first six months of 2018, according to data from China's General Administration of Customs (Tao and Hui, 2018). As the tariffs imposed by the Trump administration fall on the products originating from China, the affiliates of Japanese MNCs in China may be attacked by the trade war as well. It is thus interesting to study whether the effects exist and what the effects are.

Japan is likely the most affected country by the indirect effects of the US-China trade war. First, Japan is the third biggest economy in 2017 (in terms of GDP), just following the US and China. Second, Japan is one of the most important trade partners of both the US and China. In 2017, Japan is the second largest trading partner of China in terms of the sum of import and export, and the fourth largest trading partner of the US. Third, Japan has many

[1] As discussed in Huang et al. (2018), trade deficit and the "forced technology transfer" are only two of the many reasons of Trump's trade war which are claimed by the US government. Other covert goals of the trade war include bringing back the manufacturing jobs from China to the US, stopping China's unfair practices against foreign businesses, slowing down the rise of China especially in the high-tech market, etc.

large MNCs, and the US and China are the top two destinations of MNC affiliates (Spinelli et al., 2018). Given the strong linkages in trade and MNC activities, we construct measures of Japanese firms' reliance on, or exposure to, the trade between China and the US using our data. Such measures are essential for us to identify the indirect effects of the trade war.

In this paper, we refer to the date of March 22, 2018 as the start of the US-China trade war. It is the date on which Trump asked the United States Trade Representative (USTR) to impose tariffs on Chinese imports according to Section 301. The announcement is surprising for almost all the people in terms of the timing, and the coverage and the magnitude of the tariffs. We utilize this event as a exogenous policy shock to study the effect of the trade on Japanese MNCs, at both the affiliate level and the parent firm level.

We conduct our analysis in two parts. We first use the quarterly data on the foreign affiliates of Japanese MNCs for a difference-in-differences (DID) analysis. We find that, relative to the affiliates in other Asian economies, the affiliates in China, especially those with high exposure to trade with North America (NA), tend to see a decline in sales after the trade war. This decline is largely driven by a drop in affiliates' sales to third countries. Compared to Japanese affiliates in other Asian economies, the Japanese affiliates in China with no/low NA trade see a 2.94 percent drop in sales to third countries, and the Japanese affiliates in China with high NA trade see a 6.58 percent drop.[2] Besides sales, the employment of the affiliates in China also goes down. The results are robust to various specifications.

Second, we conduct an event study using the stock price data of Japanese listed firms. After constructing an index of their reliance on China-NA trade, we find that, relative to other listed firms, the listed firms that are exposed to China-NA trade see a decline in stock prices in the window around Mar 22, 2018. They have a lower stock return of 0.404 percent. If the listed firms' affiliates in China have a larger import share from Japan, their stock market returns are even lower. The placebo test utilizing the Chinese stock market crash confirms that this effect is caused by the reliance of these affiliates on China-NA trade, rather than their exposure to the Chinese market.

Our study is related to several strands of literature. First, we contribute to the growing

[2] "Low trade" means the affiliate's trade intensity with NA is below median, while "high trade" means the affiliate's trade intensity with NA is above median.

literature on the US-China trade conflicts (Huang et al., 2018; Amiti et al., 2019; Fajgelbaum et al., 2019). We provide new evidence how the trade war impacts a third country other than the US and China. Second, we contribute to the studies about the firm-level responses to trade policies. Prior research has shown the effect of trade policy shocks on firms' employment (David et al., 2013; Pierce and Schott, 2016), technology innovation (Crowley, 2006; Bloom et al., 2016), and entry to foreign markets (Crowley et al., 2018). We show that the US-China trade war negatively affect the operation and stock market performance of Japanese MNCs. Third, our study is also related to the studies describing the relationship between MNCs and trade (Helpman, 1984, 1985; Ramondo et al., 2016), highlighting the role of global value chain in propagating trade shocks.

The remainder of the paper is organized as follows. Section 2 discusses the data and the construction of variables. Section 3 analyzes the how Japanese affiliates in China are affected by the trade war, and Section 4 studies the stock market performance of Japanese listed firms exposed to China-NA trade. Section 5 concludes.

2 Data and Variables

2.1 Surveys on Overseas Affiliates

2.1.1 Quarterly Data

Our quarterly affiliate-level data come from the Quarterly Survey of Overseas Subsidiaries conducted by the Ministry of Economy, Trade and Industry (METI). The purpose of this survey is to understand the dynamic changes in the overseas activities of Japanese MNCs and promote flexible policymaking for both the Japanese economy and industry. The survey covers actual figures for sales, capital investment (acquisition of tangible fixed assets excluding land and depreciation), and number of employees at the period ending on the last day of each quarter. Importantly, sales are further decomposed into local sales, sales to Japan and sales to third countries. The high frequency of the data and the finer division of sales are crucial for our empirical analysis. Based on this quarterly survey, we constructed a panel dataset of foreign affiliates from 2016q1 to 2018q3.[3]

The survey covers Japanese companies that met all the following criteria: manufacturing firms with 100 million yen or more in capital; with 50 or more employees; with overseas subsidiaries. For the above parent companies, this survey targets their overseas affiliates in manufacturing sector with 50 or more employees and with 50% or more of their capital coming from parent companies, including both direct and indirect funds (such as funds provided via local subsidiaries). The survey was self-declarations by Japanese parent companies. These affiliates are located in North America, China, Hong Kong, Asia (excluding China and Hong Kong), Europe and other regions. The Number of foreign affiliates covered by this survey is around 5,000 every quarter and the response rate is about 80%.

2.1.2 Yearly Data

Our yearly affiliate-level data come from the Basic Survey on Overseas Business Activities, which is also conducted by METI. Compared to the quarterly data, our yearly data covers a lot more information on Japanese multinationals' global activities, and also includes multinational affiliates that are in the service sector and those that are of smaller sizes. However, the most recent data we have are in the 2015 and 2016 fiscal years (2015q2-2016q1, 2016q2-2017q1). Therefore, we cannot use the dataset to examine affiliates' responses to the US-China trade war in 2018. We only use the yearly data to construct measures of reliance on trade with North America, both at the affiliate level and at the listed parent firm level.

Each affiliate in the dataset reports a detailed decomposition of their sales and purchases. Similar to the quarterly data, sales are first decomposed into (1) local sales (2) sales back to Japan and (3) sales to a third country. Moreover, affiliates further reports a decomposition of (3) into sales to four regions of the world: North America, Asia, Europe, and others. Similarly, we also know affiliates' imports from North America, Japan, and other regions from its decomposition of its total purchases.

With such information, we can calculate an affiliate's total trade with North America (NA)

[3]Considering the start of Trump's office in the end of 2016, we will further restrict our sample period to 2017q1 to 2018q3 for the baseline DID analysis, to minimize shocks other than the US-China trade war. However, we will extend the results using the full sample in the robustness check.

by adding up its imports from and exports to NA. To measure the reliance of trade with NA, we divide this trade volume by the total size of the firm. For the affiliate-level reliance index, we simply divide total trade with NA by the total sales of the affiliate. For the parent-firm level reliance index, we use the global sales of the parent firm, which is the sum of the domestic sales of the parent firm in Japan and the total sales of all affiliates around the world, net of intra-firm exports.[4]

2.2 Financial Data of Listed Firms

We use financial data of publicly listed firms in Japan to examine the stock market responses and changes in market valuation. The daily stock price data and quarterly firm fundamentals are obtained from Compustat (Global). Japanese firms are identified according to the Country Code "JPN", which indicates that the firms are incorporated or legally registered in Japan. After dropping observations without basic controls such as book values and leverage ratios in 2017, we have a sample of 3,155 Japanese listed firms.

To examine the effect of US-China trade war on the market valuation of Japanese MNCs, we construct two measures of stock market responses, cumulative stock returns (CRR) and cumulative abnormal returns (CAR). The two measures are respectively calculated over a 3-day window around the event date of March 22, 2018, to facilitate our event study. Specifically, the CRR for each listed firm is constructed by adding up the daily stock returns on the three days in the window

$$CRR_i[-1,1] = \Sigma_{t=-1}^{+1} R_{i,t}, \tag{1}$$

where we denote the event date March 22, 2018 as date 0; $CRR_i[-1,1]$ indicates the CRR for stock i over the period from day -1 to day $+1$; $R_{i,t}$ is the daily return of stock i on date t, calculated from the closing prices of stock i on date t and $t-1$ ($R_{i,t} = \frac{Price_{i,t} - Price_{i,t-1}}{Price_{i,t-1}}$).

To adjust for systematic changes over the entire stock market, we calculate a second measure, CAR, as the sum of abnormal returns on the three days.

[4]We exclude intra-firm exports to avoid double counting. An affiliate in China can sell their output to the Japanese parent firm, which will be an input for the parent firm's domestic output.

$$CAR_i[-1,1] = \Sigma_{t=-1}^{+1} AR_{i,t}, \quad (2)$$

where $CAR_i[-1,1]$ indicates the CAR for stock i over the period from day -1 to day $+1$; $AR_{i,t}$ is the abnormal return for stock i on date t, adjusted according to the market model (Schwert, 1981; MacKinlay, 1997). The market benchmark in the model we apply is the Nikkei 225 Index, obtained from the website of Nikkei Indexes. Following Huang et al. (2018), we estimate the market model parameters, the alpha and beta, by regressing stock i's returns on the market returns, over the period from day $t-220$ to $t-21$ before date t ($R_{i,t} = \alpha_{i,t} + \beta_{i,t} R_{m,t} + \epsilon_{i,t}$).[5] The abnormal return for stock i is thus the difference between the actual return and the expected return ($AR_{i,t} = R_{i,t} - E[R_{i,t}]$ where $E[R_{i,t}] = \hat{\alpha}_{i,t} + \hat{\beta}_{i,t} R_{m,t}$).

We use CAR in addition to CRR as a dependent variable for robustness checks. On one hand, by using CAR, we can exclude the general market movement and the common factors from the returns. As the common factors exist in both the treatment group and the control group, it is good to exclude them to facilitate the event study. On the other hand, the deduction of the expected return may make CAR hard to interpret because the parameters in the estimated market model (alpha and beta) can be related to firms' fundamentals. If the adjustment of returns is correlated with the treatment (US-China trade war) and related events before Mar 22, the event study may even be biased. In comparison, CRR is an intuitive measure of stock market performance, which is not subject to model specifications when adjusting for the common factors.

To control for other factors that may confound the effect of the trade war, we use Compustat data on firm fundamentals in 2017, before the trade war happened. We compute firms' market value by multiplying the number of shares outstanding by the stock price. For the market-to-book ratio, we divide the market value by the book value. The leverage ratio is calculated as total debt divided by total assets.

[5] Due to quantitative easing in Japan, the risk-free rate, measured as the interest rate of Treasury Discount Bills (T-Bills), has been close to zero (often negative) for the period we study. As a result, the estimation of alpha and beta will not be affected if we deduct the risk free rate from the stock return and the market return, as in the Capital Asset Pricing Model (CAPM).

3 Evidence from Overseas Affiliates

3.1 Summary Statistics

We use the quarterly affiliate-level data to examine the effect of US-China trade war on the performance of Japanese affiliates. The dependent variables of interest include total sales, local sales, sales to Japan, sales to third countries, investment, and employment. To identify the effects of the US-China trade war, we need to classify the Japanese affiliates into different groups, depending on their exposure to the US-China trade.

We first divide the Japanese affiliates into a treatment group and a control group. The treatment group includes all the Japanese affiliates in China. Whereas the control group consists of the Japanese affiliates in other parts of Asia excluding China and Hong Kong.[6] We only include the Japanese affiliates in other parts of Asia in the control group, because we want to make sure the control group is similar enough to the treatment group. For example, similar to affiliates in China, affiliates in other parts of Asia are geographically close to Japan and operate in an environment with relatively low labor costs and weak institutions. As a result, they are more likely to experience similar shocks other than the US-China trade war, which makes them a better control group.

Second, we further separate the Japanese affiliates in China according to their reliance of trade with NA. The Japanese affiliates that rely more on trade with NA are expected to be more affected by the US-China trade war. From the yearly survey data, an affiliate's reliance of trade with NA is calculated as the average share of its trade with NA in its total sales in the 2015 and 2016 fiscal years.[7] Among the Japanese affiliates in China that have positive trade with NA, the median trade share is 0.03, with many affiliates whose trade shares are very close to zero. We therefore classify affiliates whose share is below 0.03 (including those with 0) to be in the treatment group (1), and classify affiliates whose share is larger than 0.03 to be in the treatment group (2). Our hypothesis is that the affiliates in the treatment group (2), with

[6] Due to the United States-Hong Kong Policy Act of 1992, goods originating from Hong Kong are not subject to the tariffs which the US imposes on China. Thus the affiliates in Hong Kong seem not affected by the US-China trade war. However, Hong Kong is often the transit point for trade from/to Mainland China and thus affiliates in Hong Kong may also be affected. To avoid complication, we exclude Hong Kong from the control group.

[7] We then take the average of these ratios in the two years to smooth out short-run fluctuations.

high exposure to trade with NA, will be affected more by the US-China trade war than the affiliates in the treatment group (1), with no/low exposure to trade with NA.

Table 1 shows the summary statistics of the control group and the two treatment groups respectively, during the period from 2017q1 to 2018q3. First, the number of affiliates is the largest in the control group and the smallest in the treatment group (2). There are 2,195 affiliates in other Asian economies, 1,609 affiliates in China with no/low exposure to trade with NA, and 126 affiliates in China with high exposure to trade with NA. The large number of affiliates in treatment group (1) is due to the many affiliates in China without any trade with NA. Second, for affiliates in China with high exposure to trade with NA, trade with NA accounts for 16% of total sales on average. However, for affiliates in other Asian economies, trade with NA accounts for only 3% of total sales. Third, we find that the total sales and sales to third countries are the highest for the affiliates in other parts of Asia. However, the local sales is the highest for affiliates in China with no/low trade with NA, and the sales to Japan is the highest for affiliates in China with high exposure to trade with NA. As compared to the affiliates in China with no/low exposure to trade with NA, the affiliates in China with high exposure to trade with NA have a smaller share of local sales (i.e., local sales divided by total sales) but a larger share of sales to third countries (i.e., sales to third countries divided by total sales). Fourth, the affiliates in China with high trade with NA have the largest import share from Japan, 17%, calculated as the imports from Japan divided by all purchases. In comparison, the share is only 10% for affiliates in China with no/low trade with NA, and 13% for affiliates in other parts of Asia. If the affiliates with high trade with NA are more affected by the US-China trade war, more upstream suppliers in Japan will be negatively affected as well.

Since we have obtained three groups of Japanese affiliates (i.e., the control group, the treatment group (1), and the treatment group (2)), we can examine the differences in their performance separately before the US-China trade war and after. We first simply plot the total sales and the sales to third countries within each group over time, and then estimate the impact of the US-China trade war using a difference-in-differences analysis.

Table 1: Summary Statistics of the Control and Treatment Groups

	Control group Other Asia (excluding Mainland China & HK) $N_{aff} = 2195, Obs = 14912$				**Treatment group (1)** China, trade share with NA < 0.03 $N_{aff} = 1609, Obs = 10743$				**Treatment group (2)** China, trade share with NA ≥ 0.03 $N_{aff} = 126, Obs = 869$			
	Mean	SD	25pct	75pct	Mean	SD	25pct	75pct	Mean	SD	25pct	75pct
Total sales	39.21	141.63	4.10	28.54	37.10	188.21	3.21	24.95	29.65	49.20	5.59	37.59
Local sales	23.81	112.94	0.38	14.30	27.95	185.45	0.68	16.04	17.28	30.57	1.23	20.93
Sales to Japan	6.03	22.85	0.00	3.09	5.70	29.82	0.00	2.28	8.01	32.73	0.20	4.38
Sales to third countries	9.38	45.88	0.00	3.77	3.45	14.92	0.00	0.82	4.35	8.20	0.18	5.08
Investment	1.25	7.87	0.00	0.55	0.75	4.22	0.00	0.29	0.78	1.83	0.00	0.77
Labor	896.16	1930.63	157.50	872.00	636.80	1334.27	124.00	639.00	869.83	1201.58	161.00	1170.00
Trade share with NA (15-16)	0.03	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.17	0.05	0.18
Import share from Japan (15-16)	0.13	0.24	0.00	0.14	0.10	0.21	0.00	0.05	0.17	0.23	0.00	0.28

Notes: The table shows the summary statistics of Japanese affiliates in the baseline sample. Dependent variables include total sales, local sales, sales back to Japan, sales to third countries, and investment, which are in units of million USD; and employment, which is measured in number of workers. The independent variable, trade share with NA (15-16), is the average ratio of trade with North America to total sales in 2015 and 2016 fiscal years of the affiliates. Import share from Japan (15-16) is the average ratio of import from Japan to total purchases in 2015 and 2016 fiscal years. We restrict the sample to the period of 2017q1 to 2018q3.

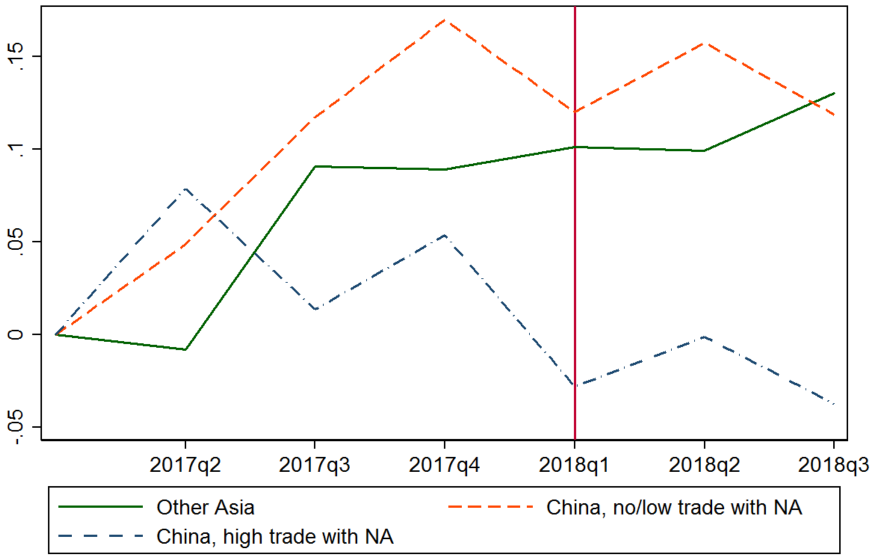
3.2 Sales before and after the US-China Trade War

Using a sample period from 2017q1 to 2018q3 after Trump's presidency, we take the logarithm of the total sales for the three groups and plot the time series separately. 2017q1 is normalized to zero. As shown in Figure 1, the green solid line refers to the control group, while the red dashed line and the blue dash-dotted line refer to the treatment group (1) and the treatment group (2), respectively. The event of US-China trade war is indicated by the vertical line. We can see that the three groups share a similar trend before the trade war. However, the total sales for the affiliates in China with high trade with NA drop sharply around the trade war and after. The total sales for the affiliates in China with no/low trade with NA remain roughly the same before and after the trade war, as compared to the affiliates in other Asian economies.

To further investigate whether the sales to third countries are affected by the trade war, we plot the time series of the log sales to third countries for affiliates respectively in the three groups. Figure 2 shows that the sales to third countries share a similar trend for the treatment group (1) and the treatment group (2). Compared to the control group, the sales to third countries for the two treatment groups are similar before the US-China trade war but drop significantly after the US-China trade war. In other words, there is no drop in the sales to third countries for the affiliates in other Asian economies after the US-China trade war, but there is a large drop for the affiliates in China.

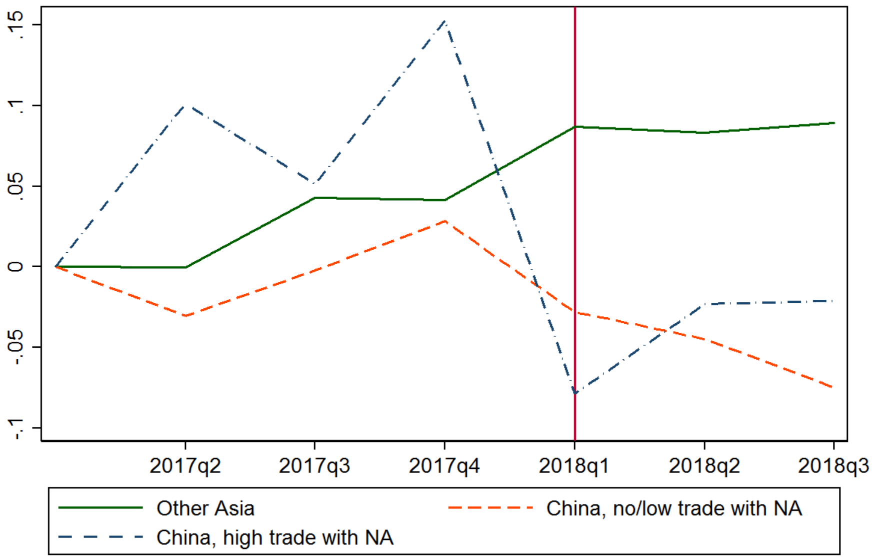
From the aggregate time series, we hypothesize that the trade war has a significant negative effect on the sales of the affiliates in China, compared to the affiliates in other Asian economies. And the drop in the total sales is likely to be driven by the drop in the sales to third countries.

Figure 1: Log Total Sales for Japanese Affiliates (2017q1 normalized to zero)



Notes: The figure shows the log total sales separately for three groups of Japanese affiliates. "Other Asia" refers to the Japanese affiliates in other Asian economies; "China, no/low trade with NA" shows the Japanese affiliates in China with a trade share with NA lower than 0.03; "China, high trade with NA" shows the Japanese affiliates in China with a trade share with NA higher than 0.03". Log of total affiliate sales in 2017q1 is normalized to 0. The vertical line indicates 2018q1.

Figure 2: Log Sales to Third Countries (2017q1 normalized to zero)



Notes: The figure shows the log sales to third countries separately for three groups of Japanese affiliates. "Other Asia" refers to the Japanese affiliates in other Asian economies; "China, no/low trade with NA" shows the Japanese affiliates in China with a trade share with NA lower than 0.03; "China, high trade with NA" shows the Japanese affiliates in China with a trade share with NA higher than 0.03. Log of affiliate sales to third countries in 2017q1 is normalized to 0. The vertical line indicates 2018q1.

We then test our hypothesis formally by conducting a difference-in-differences analysis.

3.3 Difference-in-differences Analysis

3.3.1 Empirical Specification

Using the treatment groups and the control group defined above, and an event cutoff of 2018q1 (March 22, 2018), we examine the effect of trade war in a difference-in-differences (DID) setting. We first use a sample period of 2017q1 to 2018q3, which covers the most recent two years around the trade war, after Trump came to the presidency. The baseline regression equation is as the following:

$$y_{c,a,t} = \beta_1 \cdot China_c \cdot Post_t \cdot \mathbf{1}(Share_a < 0.03) + \beta_2 \cdot China_c \cdot Post_t \cdot \mathbf{1}(Share_a \geq 0.03) + \alpha_{c,a} + \eta_t + \lambda_{c,q} + \epsilon_{c,a,t}, \quad (3)$$

where $y_{c,a,t}$ stands for the outcome variable (i.e., total sales, local sales, sales to Japan, sales to third countries, investment, and employment) for affiliate a in country c in quarter t; $China_c \cdot Post_t$ is the DID term (our variable of interest) which is the product of two dummies. $China_c$ equals 1 if the affiliate is in China, and 0 if in other Asian economies; $Post_t$ indicates whether it is after the trade war (2018q1).

As discussed before, we have two treatment groups (1) and (2) with heterogeneous exposure to trade with NA, so we multiply the DID term with a dummy indicating whether the affiliate has high exposure to trade with NA. Specifically, $Share_a$ indicates the share of affiliate a's trade with NA in its total sales, and thus the dummy $Share_a < 0.03$ refers to the affiliate in the treatment group (1) with no/low exposure to trade with NA; $Share_a \geq 0.03$ indicates the affiliates the treatment group (2) with high exposure to trade with NA. As a result, β_1 shows the difference in the effects of the trade war between the affiliates in China with no/low exposure to trade with NA and the affiliates in other Asian economies; β_2 shows the difference in the effects of the trade war between the affiliates in China with high exposure to trade with NA and the affiliates in other Asian economies.

To control for time-invariant affiliate characteristics, we include $\alpha_{c,a}$, which is the affiliate fixed effects. To control for common factors for all affiliates varying over time, we include η_t, which is the year-quarter fixed effects. To control for country-specific seasonality, we include $\lambda_{c,q}$, which is the country-QoY (quarter of the year) fixed effects ($q = 1, 2, 3, 4$). $\epsilon_{c,a,t}$ is the error term, which we cluster at the affiliate level to avoid the problem of serial correlation.

3.3.2 Results

Table 2 show the DID results for dependent variables in levels and in logs, respectively. First, we find that, as compared to the affiliates in other Asian economies (the control group), the affiliates in China that rely heavily on trade with NA (the treatment group (2)) have significantly lower total sales after the US-China trade war. After the trade war begins in 2018q1, the total sales for the affiliates in China with high trade with NA decrease by 5.32% as compared to the affiliates in other Asian economies. Second, more importantly, we find the affiliates in China reduce their sales to third countries significantly. After the trade war, the sales to third countries decrease by 2.94% for the affiliates in China with no/low exposure to trade with NA and 6.58% for the affiliates in China with high exposure, compared to the affiliates in other Asian economies. Third, as compared to the affiliates in other Asian economies, the affiliates in China with no/low exposure to trade with NA have higher local sales after the trade war.

The decrease in affiliates' total sales due to the trade war is likely to be driven by the decrease in sales to third countries. For the other two components of total sales, the effects of the trade war on local sales and sales to Japan are not significantly negative. The reason may be that the US's tariffs reduce the competitiveness of Japanese affiliates in China in the US market, and their sales to the US decrease. However, the affiliates' sales in China and Japan are not likely to be affected. Moreover, due to China's retaliation on the US's exports to China, the Japanese affiliates may face less competition in the Chinese market and that may explain the increase in the affiliates' local sales after the trade war. We will illustrate further on this point by examining outcomes in different industries below.

Furthermore, we find that the employment decreases for the affiliates in China due to the trade war as compared to the affiliates in other Asian economies. Specifically, the employment of the affiliates in China with no/low exposure to trade with NA decreases by 3.77%, as compared to the affiliates in other Asian economies. The employment of the affiliates in China with high exposure to trade with NA decreases by 4.15%, as compared to the affiliates in other Asian economies. In contrast, the trade war has no significant effect on the investment of the affiliates in China. The reason may be that labor is a more flexible input than investment to adjust for the Japanese affiliates in China. In China, manufacturing employers are subject to relatively few employment regulations, and it is relatively easy for them to terminate employment. In contrast, investment, especially the investment in large equipment, takes long time to plan and install, and is thus difficult to adjust in short term.

We also plot the estimated coefficients for the two treated groups of firms over time. The results are shown in Figure 3 for the dependent variable of total sales, Figure 4 for sales to third countries, and Figure 5 for employment. The pre-trends for treatment group (2) are estimated to be similar to the control group. Note that we are unable to estimate the pre-trends for treatment group (1) relative to the control group, because we control for country-quarter-of-year fixed effects and thus have to normalize coefficients in three more quarters. In our robustness checks, we extend the sample period back to 2016q1 and find no pre-trends for treatment group (1).

In addition to our main specification, we implement four robustness checks. First, we use 2018q2 as the cutoff between pre-treatment and post-treatment and show the results in Table A.1. Second, we use $s = 0$ as the cutoff for the exposure to trade with NA, so all the Japanese affiliates in China with positive trade with NA are included in the treatment group (2). The results are shown in Table A.2. Third, we use a longer sample period covering 2016q1-2018q3 as in Table A.3. Lastly, we show the results of levels instead of logs in Table A.4. To conclude, our estimation results are not sensitive to the choice of different specifications.

3.3.3 Heterogeneous Effects

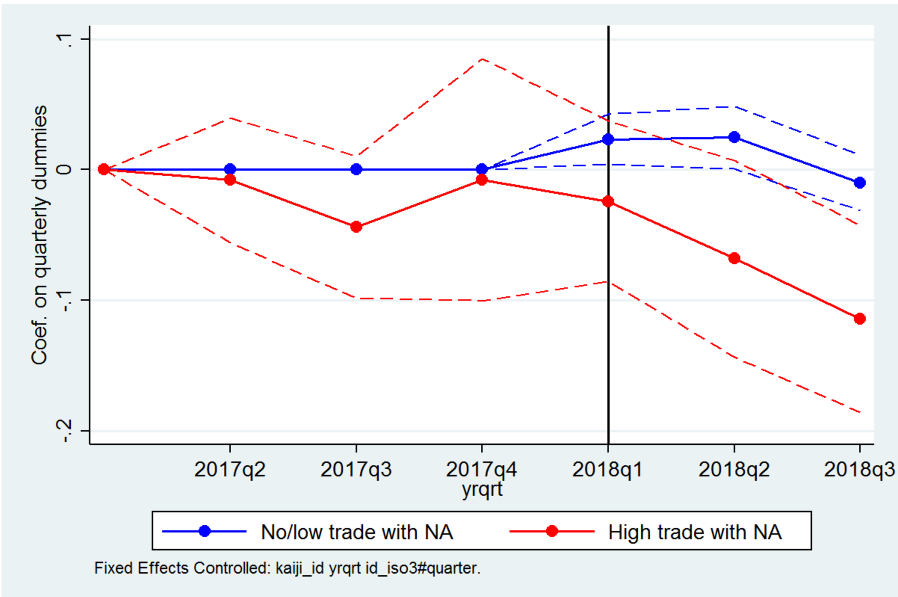
The impact of the US-China trade war on the Japanese affiliates in China may be heterogeneous. In this section, we examine whether the impact of the trade war is heterogeneous for the Japanese affiliates in different industries, with different levels of reliance on the import from

Table 2: Impact of Trade War on Japanese Affiliates

Dependent Var. (logs)	Total Sales (1)	Local Sales (2)	Sales to Japan (3)	Sales to Third (4)	Investment (5)	Labor (6)
China $\times \mathbf{1}(s < 0.03) \times \mathbf{1}(t \geq 2018q1)$	0.0129	0.0336^a	-0.00481	-0.0294^a	0.0149	-0.0377^a
	(0.00849)	(0.00904)	(0.00830)	(0.00932)	(0.0104)	(0.00449)
China $\times \mathbf{1}(s \geq 0.03) \times \mathbf{1}(t \geq 2018q1)$	-0.0532^b	-0.0243	-0.0427	-0.0658^b	-0.0202	-0.0415^a
	(0.0231)	(0.0300)	(0.0326)	(0.0260)	(0.0228)	(0.00883)
Affiliate FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-QoY FE	Yes	Yes	Yes	Yes	Yes	Yes
N	26523	26523	26523	26523	26523	25898
R^2	0.964	0.963	0.956	0.955	0.791	0.995

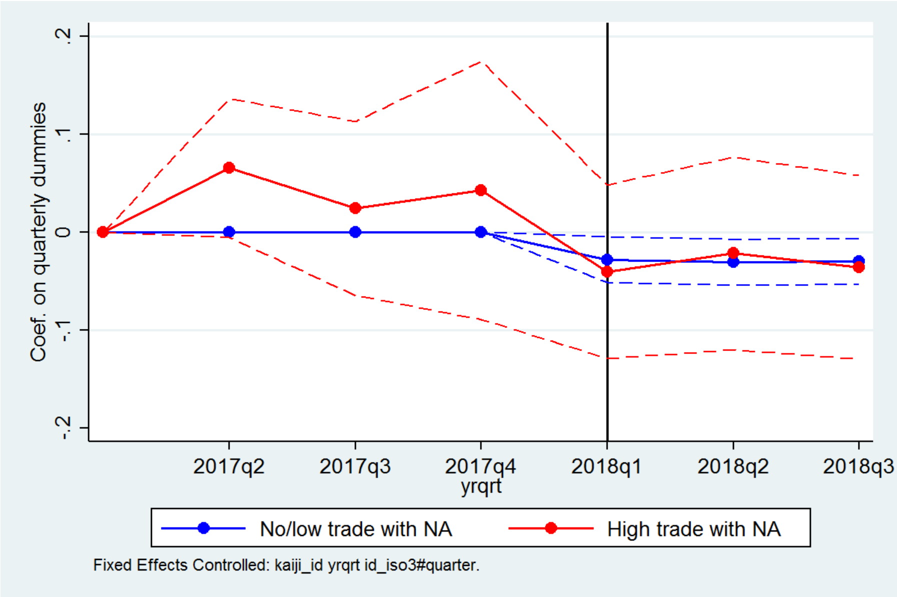
Notes: This table focuses on our baseline sample. Affiliates in the baseline sample report total sales, local sales, sales back to Japan, sales to third countries, investment, and employment. Monetary variables are in units of million USD, while labor is measured in number of workers. We take the log of each dependent variable in the regression. s is the average ratio of trade with North America to total sales in 2015 and 2016 fiscal years of the affiliate. We control affiliate FE, year-quarter FE, and country-QoY (quarter of the year) FE. We restrict the sample to the period of 2017q1 to 2018q3. Standard errors clustered at affiliate level: c 0.1, b 0.05, a 0.01.

Figure 3: Estimated Coefficients by Quarter for Log Total Sales



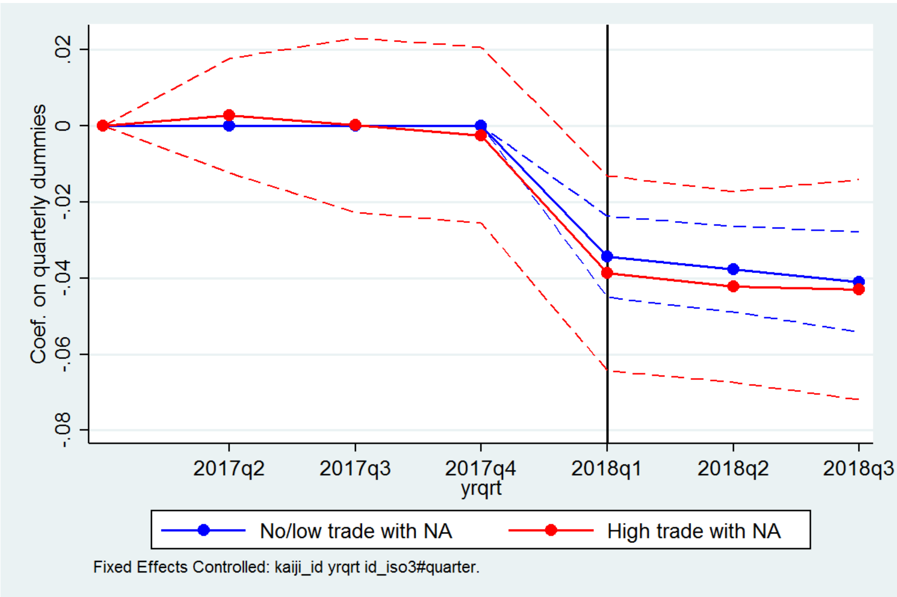
Notes: The figure shows the estimated coefficient of each quarter (2017q1 to 2018q3) separately for the two treatment group in the regression of log total sales. "No/low trade with NA" shows the Japanese affiliates in China with a trade share with NA lower than 0.03 as compared to the affiliates in other Asian economies; "high trade with NA" shows the Japanese affiliates in China with a trade share with NA higher than 0.03 as compared to the affiliates in other Asian economies. Since we add affiliate, year-quarter, and country-QoY (quarter of the year) fixed effects, we choose to normalize the following five coefficients to zero: coefficients of the 2017q1-2017q4 for affiliates with no/low trade with NA; and the coefficient of 2017q1 for affiliates with high trade shares with NA. The vertical line indicates 2018q1.

Figure 4: Estimated Coefficients by Quarter for Log Sales to Third Countries



Notes: The figure shows the estimated coefficient of each quarter (2017q1 to 2018q3) separately for the two treatment group in the regression of log sales to third countries. "No/low trade with NA" shows the Japanese affiliates in China with a trade share with NA lower than 0.03 as compared to the affiliates in other Asian economies; "high trade with NA" shows the Japanese affiliates in China with a trade share with NA higher than 0.03 as compared to the affiliates in other Asian economies. Since we add affiliate, year-quarter, and country-QoY (quarter of the year) fixed effects, we choose to normalize the following five coefficients to zero: coefficients of the 2017q1-2017q4 for affiliates with no/low trade with NA; and the coefficient of 2017q1 for affiliates with high trade shares with NA. The vertical line indicates 2018q1.

Figure 5: Estimated Coefficients by Quarter for Log Labor Employment



Notes: The figure shows the estimated coefficient of each quarter (2017q1 to 2018q3) separately for the two treatment group in the regression of employment. "No/low trade with NA" shows the Japanese affiliates in China with a trade share with NA lower than 0.03 as compared to the affiliates in other Asian economies; "high trade with NA" shows the Japanese affiliates in China with a trade share with NA higher than 0.03 as compared to the affiliates in other Asian economies. Since we add affiliate, year-quarter, and country-QoY (quarter of the year) fixed effects, we choose to normalize the following five coefficients to zero: coefficients of the 2017q1-2017q4 for affiliates with no/low trade with NA; and the coefficient of 2017q1 for affiliates with high trade shares with NA. The vertical line indicates 2018q1.

Japan, and with different number of "sibling affiliates" (the affiliates in other Asian economies that belong to the same parent firm).

The Japanese affiliates in China could be in different industries and different positions of the global value chain. For affiliates in the industries explicitly included in the tariff list by the US, their sales to third countries are expected to be negatively affected. Moreover, the effect of the trade war could also be negative for the affiliates in the upstream supply chain of these industries. However, for affiliates in other industries, the effect should be weaker. Furthermore, considering China's retaliation against the US's exports to China in some industries, the affiliates in these industry could even see higher local sales because they may face less competition from the US manufacturers.

Table 3 shows the DID results respectively for three industries. On the one hand, Panel A and Panel B show two industries included in the 50-billion tariff list. Panel A shows the results for the Japanese affiliates producing electrical machinery and transportation equipment. The sales to third countries drop by 7.51% for the affiliates in China with high trade with NA. Panel B shows the results for the Japanese affiliates producing chemicals, iron, steel, and non-ferrous metals. The affiliates in China with high trade with NA see a drop of 14.5% in sales to third countries. For these two industries, the drop in sales is quite substantial, larger than the average level in the baseline results.

On the other hand, Panel C of Table 3 shows the results of the food, beverage, and animal feed industry, which is not directly included in the tariff list. For the Japanese affiliates in this industry, there is no significant drop in sales to third countries due to the US-China trade war. However, there is a significantly positive effect on the local sales, especially for the affiliates in China with no/low trade with NA. The reason may be that agricultural products such as soybean accounts for a large share in the US export to China, and China's retaliation targeting the food industry in turn benefits the Japanese affiliates. After the US-China trade war, the Japanese affiliates face less US competition and see higher local sales in China, which even drive up the total sales. To conclude, the results confirm our hypothesis that the effects of the trade war on Japanese affiliates in China are heterogenous across industries, with some affiliates even benefiting from the increase in local sales.

Table 3: Impact of Trade War on Japanese Affiliates by Industries

Dependent Var. (logs)	Total Sales (1)	Local Sales (2)	Sales to Japan (3)	Sales to Third (4)	Investment (5)	Labor (6)
Panel A. Electrical machinery and transportation equipment						
China $\times \mathbf{1}(s < 0.03) \times \mathbf{1}(t \geq 2018q1)$	-0.0100	0.0168	-0.00491	-0.0377^b	0.0173	-0.0326^a
	(0.0133)	(0.0145)	(0.0133)	(0.0155)	(0.0186)	(0.00720)
China $\times \mathbf{1}(s \geq 0.03) \times \mathbf{1}(t \geq 2018q1)$	-0.0658^c	-0.0457	-0.0875	-0.0751^c	-0.0323	-0.0372^a
	(0.0372)	(0.0492)	(0.0532)	(0.0389)	(0.0359)	(0.0131)
N	11,659	11,657	11,656	11,657	11,659	11,369
Panel B. Chemicals, iron, steel, and non-ferrous metals						
China $\times \mathbf{1}(s < 0.03) \times \mathbf{1}(t \geq 2018q1)$	0.0234	0.0355^b	-0.0148	-0.00685	-0.00629	-0.0291^a
	(0.0184)	(0.0175)	(0.0168)	(0.0174)	(0.0209)	(0.00730)
China $\times \mathbf{1}(s \geq 0.03) \times \mathbf{1}(t \geq 2018q1)$	-0.0233	0.0392	0.0657	-0.145^b	-0.0484	-0.0674^a
	(0.0446)	(0.0515)	(0.0645)	(0.0635)	(0.0345)	(0.0170)
N	5,496	5,495	5,494	5,494	5,496	5,320
Panel C. Food, beverage, and animal feed						
China $\times \mathbf{1}(s < 0.03) \times \mathbf{1}(t \geq 2018q1)$	0.0591^b	0.0739^a	0.00861	-0.0178	0.0301	-0.0638^a
	(0.0248)	(0.0280)	(0.0193)	(0.0189)	(0.0465)	(0.0191)
China $\times \mathbf{1}(s \geq 0.03) \times \mathbf{1}(t \geq 2018q1)$	0.00973	0.0178	0.00328	-0.0193	-0.305^a	-0.204^a
	(0.0265)	(0.0273)	(0.0141)	(0.0150)	(0.0273)	(0.0140)
N	1,017	1,017	1,017	1,017	1,017	1,001

Notes: This table shows the DID results for Japanese affiliates of three different industries. Panel A refers to the industry of electrical machinery and transportation equipment; Panel B refers to the industry of chemicals, iron, steel, and non-ferrous metals; Panel C refers to the industry of food, beverage, and animal feed. Panels A and B show industries in Trump's tariff list on March 22, 2018, but Panel C show one industry not included in the tariff list. We take the log of each dependent variable. s is the average ratio of trade with North America to total sales in 2015 and 2016 fiscal years of the affiliate. We control affiliate FE, year-quarter FE, and country-QoY (quarter of the year) FE. We restrict the sample to the period of 2017q1 to 2018q3. Standard errors clustered at affiliate level: c 0.1, b 0.05, a 0.01.

Different Japanese affiliates have different levels of integration within their parent firms' value chains. We measure such integration using the affiliates' import share from Japan. In principle, imported inputs from Japan may also come from other companies. However, in a limited subsample of our data with a breakdown of imports from Japan into intra- and inter-firm imports, we find that almost all of such imports are intra-firm (90%). Therefore, if an affiliate imports more from Japan as a share of its total purchase, it is more integrated in its parent firms' value chain. Table A.5 shows that if the import share from Japan is larger, the effects of the trade war on total sales for the affiliates in China are more negative, though not statistically significant. To conclude, we find suggestive evidence that the trade war has a larger impact on affiliates that are more integrated in the value chain. This effect, as will be discussed below, shows up more strongly when considering the entire MNC as a whole.

We also examine the heterogeneous effects according to the number of "sibling affiliates" (the affiliates in other Asian economies that belong to the same parent firm), to shed light on the effect of production reallocation. The hypothesis is that if one affiliate in China has many siblings in other countries, it is easier to reallocate its production to other countries, leading to a larger decrease in sales. In particular, we construct an interaction term of the DID term and the number of the other affiliates that belong to the same parent firm in other Asian economies. Table A.6 shows that the coefficients for the interaction term are not statistically significant but the effects are negative on the total sales. The effect on sales to third countries is also negative for the affiliates in China with high NA trade. To sum up, we have suggestive evidence that production reallocation may lead to a more negative effect of the trade war on the affiliates in China.

To conclude, we find that, as compared to the affiliates in other Asian economies, the affiliates in China, especially those with high exposure to trade with NA, tend to see a decline in sales due to the trade war. And the decline is the largest for the sales to third countries, which drives the decline in the total sales. We also see a decline in the employment for the Chinese affiliates, but no significant drop in the investment. In the industries directly targeted by the US tariff list, the Japanese affiliates see larger drop in sales to third countries, while in the industries such as food and tobacco, local sales actually increased. This may to some extent explain why we see insignificant effect of the trade war on the total sales for the affiliates with no/low trade with NA. In the next section, we shift our focus from the Japanese affiliates to their parent firms in Japan and examine what effect the US-China trade war has on the stock market performance of the Japanese parent firms.

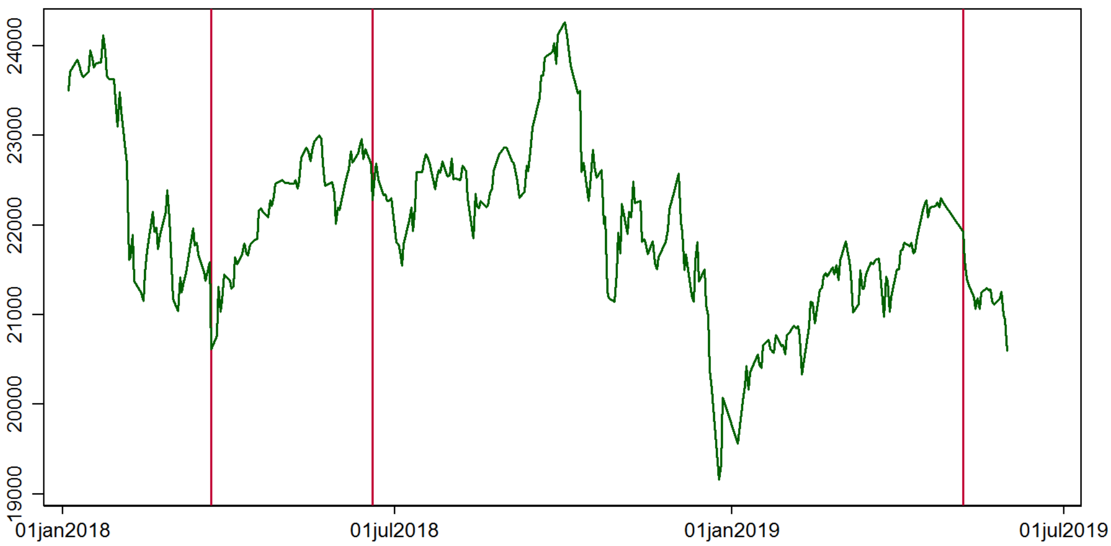
4 Evidence from Stock Market Performance of Parent Firms

4.1 Summary Statistics

Here we look at the stock market performance of Japanese MNCs at the aggregated level. The dependent variables are CRR and CAR of the Japanese listed firms over the three day window around the trade war event on March 22, 2018. As shown in Figure 6, the daily Nikkei 225

Index drops substantially on three important dates, i.e., March 22, 2018, June 18, 2018, and May 5, 2019. March 22, 2018 is the date when Trump announced the tariffs on up to $50 billion of Chinese imports. June 18, 2018 and May 5, 2019 are respectively the dates when Trump announced 10 percent additional tariffs on $200 billion worth of Chinese goods, and when Trumpraised the tariff rate from 10 percent to 25 percent. For our baseline event study, we focus on the date of March 22, 2018 which is one of the most important policy shocks, to a large extent symbolizing the beginning of the US-China trade war. We later extend our analysis to the other two event dates.

Figure 6: Nikkei 225 Index



Notes: This figure shows the daily Nikkei 225 Index from Jan 1, 2018 to May 31, 2018. The vertical lines indicate three important trade war events. On March 22, 2018, Trump issued a presidential memorandum to impose tariffs on up to $50 billion of Chinese imports. On June 18, 2018, Trump asked the US Trade Representatives to identify $200 billion worth of Chinese goods for 10 percent additional tariffs. On May 5, 2019, Trump said that the US would increase tariffs on $200 billion worth of Chinese goods from 10 percent to 25 percent. The dates are all according to the time in the US. Note that the large drop in the Index in the end of 2018 might be due to Trump's dispute with the Federal Reserve about the interest rate.

To identify the effect of the trade war on the listed parent firms of the Japanese affiliates, we measure a parent firm's reliance on trade with NA by the China-NA trade share, where we scale its trade with NA by the global total sales (as discussed in Section 2). Note that large listed Japanese firms may own many affiliates around the world. We therefore calculate the China-NA trade by summing up the trade with NA for a listed firm's Chinese affiliates. And we calculate the global total sales as the sum of sales of the parent firm and the affiliates, excluding intra-firm exports to the parent.

Table 4 shows the summary statistics for the listed parent firms. First, the average cumulative stock returns for all listed firms are negative. However, the abnormal returns (CAR) on average are less negative than the raw returns (CRR), after adjusting for the general market movement. Second, the China-NA trade share on average is close to zero. Only 6.08% of the listed firms have a positive China-NA trade share. We identify 190 listed firms that rely on trade between China and NA. For these listed firms, the average China-NA trade share is only 0.31%. The small trade share may be due to the large scales of the parent-level firms. Third, we also show the summary statistics on imports from Japan and control variables. The average import share from Japan (i.e., aggregated imports from Japan by affiliates in China divided by total sales) is 0.20%, which is much larger than the average China-NA trade share.

Table 4: Summary Statistics

	N	Mean	SD	P25	Median	P75
CRR[-1,1]	3124	-0.0283	0.0298	-0.0454	-0.0271	-0.0109
CAR[-1,1]	3026	-0.0088	0.0284	-0.0241	-0.0076	0.0066
China-NA trade dummy	3124	0.0608	0.2390	0.0000	0.0000	0.0000
China-NA trade share	3124	0.0002	0.0020	0.0000	0.0000	0.0000
China-NA trade share (>0)	190	0.0031	0.0076	0.0001	0.0005	0.0020
China import share from Japan	3124	0.0020	0.0102	0.0000	0.0000	0.0000
China import share from Japan (>0)	416	0.0147	0.0244	0.0011	0.0054	0.0168
China local sales share	3124	0.0102	0.0385	0.0000	0.0000	0.0000
China local sales share (>0)	537	0.0596	0.0756	0.0081	0.0294	0.0838
Log(market value)	3124	24.2462	1.7383	22.9522	24.0183	25.3760
Market-to-book ratio	3124	2.0221	2.3694	0.7751	1.2324	2.1541
Leverage ratio	3124	0.4869	0.2094	0.3264	0.4787	0.6360
Return-on-assets ratio	3124	0.0208	0.0407	0.0073	0.0187	0.0334

Notes: This table shows the summary statistics for Japanese listed firms, at the parent firm level. CRR[-1,1] and CAR[-1,1] are two dependent variables in the event study, which are two measures of cumulative returns of the listed firms in the three-day window around March 22, 2018. China-NA trade share is the average ratio of China's trade with North America (aggregating all the Japanese affiliates in China) to total sales in 2015 and 2016 fiscal years. China import share from Japan is the average ratio of import from Japan to China (aggregating all the Japanese affiliates in China) to total sales in 2015 and 2016 fiscal years. China local sales share is the average ratio of local sales in China (aggregating all the Japanese affiliates in China) to total sales in 2015 and 2016 fiscal years. China-NA trade dummy is a dummy indicating whether the China-NA trade is positive. The row "China-NA trade share (>0)" only summarizes observations with positive China-NA trade. Similarly, the row "China import share from Japan (>0)" only summarizes listed firms with positive import from Japan to China; the row "China local sales share (>0)" only summarizes listed firms with positive local sales in China. The last four rows refer to the financial variables we control in the event study.

To have a rough idea how the listed firms with positive China-NA trade are different from the listed firms with zero China-NA trade, we conduct t-tests on the variables and show the results in Table 5. Considering the CRR, the stock market performance is worse for the listed firms with positive China-NA trade. Meanwhile, we also find that the listed firms with positive China-NA trade are on average larger and rely more on local sales in China. We carefully control these variables in our regressions.

Table 5: T-tests according to Whether China-NA Trade is Positive

	China-NA trade > 0		China-NA trade = 0			
	N	Mean	N	Mean	Diff.	Std. Err.
CRR[-1,1]	190	-0.035	2934	-0.028	-0.007[a]	0.002
CAR[-1,1]	190	-0.010	2836	-0.009	-0.002	0.002
China import share from Japan	190	0.015	2934	0.001	0.014[a]	0.001
China local sales share	190	0.080	2934	0.006	0.074[a]	0.003
Log(market value)	190	26.145	2934	24.123	2.021[a]	0.125
Market-to-book ratio	190	1.360	2934	2.065	-0.705[a]	0.177
Leverage ratio	190	0.479	2934	0.487	-0.009	0.016
Return-on-assets ratio	190	0.024	2934	0.021	0.004	0.003

Notes: This table shows the t-tests of the variables between two groups of Japanese listed firms. The left panel shows the listed firms with positive China-NA trade, while the right panel shows the listed firms with zero China-NA trade. Significant levels of the t-tests: a 0.01.

4.2 Event Study

To investigate the effect of the US-China trade war on the stock market performance of listed Japanese firms, we conduct an event study. We refer to the listed Japanese firms which have China-NA trade as the treatment group and the listed Japanese firms without China-NA trade as the control group. More importantly, we focus on the three-day window around the event March 22, 2018. By examining the stock market performance in the window, we are able to exclude the confounding factors outside the three-day period and thus better identify the effect of the trade war. In the event study, we simply regress the stock return on the China-NA trade share:

$$Return_i[-1,1] = \delta + \gamma TradeShare_i + \boldsymbol{X}_i' \boldsymbol{\sigma} + \varepsilon_i, \tag{4}$$

where $Return_i[-1,1]$ stands for the stock market performance of listed firm i over the three-day window, measured by CRR or CAR; $TradeShare_i$ is the China-NA trade share of listed firm i. We will first use a dummy indicating whether the listed firm has positive China-NA trade to show the extensive margin, and then move on to using a continuous trade share as our independent variable.

$\boldsymbol{X}_i$ is a series of controls following the asset pricing literature (Huang et al., 2018). We include log market value, market-to-book ratio, and leverage ratio to control for the size, valuation and level of leverage of the listed firms. More importantly, we control for the China local sales share because the Japanese firms which have higher China-NA trade share also have a higher share of local sales in China. When the trade war comes into effect, the sales in China may decrease because the overall Chinese market deteriorates. We want to exclude the effect of this channel.

Table 6 shows the regression results using a dummy indicating positive China-NA trade as the independent variable. In general, we see a negative effect of the reliance on China-NA on the stock market performance in the window around the trade war event. Panel A shows the results for CRR. According to the strictest specification where we control industry FE and all covariates (Column 3), the stock market return for the listed Japanese firms with positive China-NA trade is 0.404 percent lower than the listed firms without China-NA trade, during the three-day window around March 22, 2018.[8] It suggests that the Japanese MNCs with China-NA trade are harmed by the US-China trade war as the market valuation is lower as compared to the MNCs with zero China-NA trade.

When we use CAR as the measure of stock market performance for Japanese listed firms, we see a negative effect of the trade war on the firms with positive China-NA trade, though not all statistically significant. Table 6, Panel B, shows that the stock returns for the listed firms with positive China-NA trade share are 0.217 percent lower than other listed firms (in Column 3).

More importantly, to examine the amplification effect of value chain integration, we are interested in whether the China import share from Japan of the listed firms may lead to heterogeneous effect of the trade war on stock market performance. Columns 4 and 5 in Table 6 show the results of the interaction term of positive China-NA trade and the China import share from Japan. The regression results show that for the listed Japanese firms with positive China-NA trade, if they have higher import share from Japan, the market have an even lower valuation on them. This is because, when the affiliates in China are hurt by the trade war,

[8] Huang et al. (2018) shows that the average stock return of Chinese listed firms affected by the trade war is -4.1%, which is a bigger effect than that we find on Japanese listed firms. That makes sense as the Japanese listed firms only have a part of their affiliates that are located in China. Considering the low average China-NA trade share (0.3%) for the Japanese affiliates with positive China-NA trade share, the negative effect of the trade war is actually substantial, which should not be neglected by Japanese policy makers.

they purchase less inputs from their parents in Japan. This further reduces the value added and profit of the parent firm and the stock price further declines.

In Appendices, Table A.7 shows the results using continuous China-NA trade share. This measure may only partially capture the MNC's dependence on the US-China trade, since we do not know the nature of the trade flow (key intermediate inputs or final goods). However, we still find an overall negative coefficient (though not significant). A one-standard deviation increase in the share of the China-NA trade share can lower the stock price by 0.02% to 0.12%, depending on the coefficients.

Besides March 22, 2018, we also examine the effect on the stock market performance of Japanese listed firms using the other two trade war events, i.e., June 18, 2018 and May 5, 2019. The results are presented in Tables A.8 and A.9. During the other two events when Trump proposed a longer list of tariff and a rise in the tariff rate, the stock market return of the listed Japanese firms with positive China-NA trade is significantly lower than others. It confirms our hypothesis that the US-China trade war and its escalation lead to lower market valuation of the Japanese MNCs with positive China-NA trade.

4.3 Placebo Test on Trade War

In our regression specifications, we carefully control for Japanese firms' total revenue share in China. This is crucial since the US-China trade war may affect the aggregate Chinese economy, which may particularly harm Japanese firms that have a large revenue share in China. However, a larger revenue share in China is positively correlated with the likelihood of using China as an export platform and selling to the US. Therefore, if we omit this variable, the estimated effect of our key regressor, the firms' overall dependence on trade between China and North America, will not only reflect the effect of trade war on trade, but also reflect general equilibrium effects on the entire Chinese economy.

One may worry that even after controlling for the revenue share in China, our measure of firm dependence on trade between China and North America may still pick up some general equilibrium effects. Here we perform a placebo test to show that, when there is negative news about the overall Chinese market, the control variable turns out to have predictive power while the measure of firm dependence on China-NA trade does not matter. In particular, we look at the Chinese stock market crash at the beginning of 2016. The Shanghai Stock Market Composite Index dropped more than 5% on 1/7 and 1/11, which caused panic throughout the Chinese economy. We see this as negative news for Japanese firms that have a large share of Chinese sales, but there is no evidence that such news was related to trade between China and North America. Therefore, the control variable of China local sales share should be negatively correlated with firm return in a short window around these two dates while our key regressor should not.[9]

The regression results are shown in Table 7 using a dummy indicating positive China-NA trade share. Using the same set of controls specified in the baseline event study equation (Equation 4), Columns 2, 3, 5, and 6 show that the China-NA trade share truly has no predictive power in the stock market performance while the China local sales share has a significant effect on the stock returns. To conclude, the placebo tests show that the local sales share captures the impact of the overall Chinese economy well, and our key regressor, China-NA trade share, captures the impact of the tariffs on Japanese MNCs through trade.

5 Conclusion

In this paper, we examine the impact of the US-China trade war on Japanese multinational corporations (MNCs). We find that their operations in China are negatively affected, especially when their Chinese affiliates rely heavily on trade with the North America. This further leads to a reduction in the MNCs' stock prices. The impact is amplified if the Chinese affiliates are more integrated in the value chain of the MNC. Therefore, the impact of trade war is beyond the two countries that are directly involved. To understand its impact on the global economy, we should take into account trade and multinational production linkages across countries.

[9] Since the shock happened in 2016, we use the average trade share in 2014 and 2015, instead of those in 2015 and 2016. But the results are similar.

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Table 6: Stock Market Response to Trade War - Whether China-NA trade is positive

	(1)	(2)	(3)	(4)	(5)
Panel A. Dependent variable = 100×CRR[-1,1]					
Positive China-NA trade	-0.705^a	-0.741^a	-0.404^b	-0.490^b	-0.149
	(0.160)	(0.189)	(0.199)	(0.197)	(0.209)
Positive China-NA trade × China import share from Japan				-18.98^a	-19.18^a
				(5.331)	(5.372)
China local sales share		-2.572^c	-0.865	-2.001	-0.285
		(1.471)	(1.475)	(1.484)	(1.491)
Log(market value)		0.103^a	0.0996^a	0.101^a	0.0971^a
		(0.0310)	(0.0320)	(0.0309)	(0.0320)
Market-to-book ratio		-0.0340	-0.0649^c	-0.0327	-0.0635^c
		(0.0321)	(0.0339)	(0.0321)	(0.0339)
Leverage ratio		-0.303	-0.918^a	-0.310	-0.929^a
		(0.273)	(0.310)	(0.273)	(0.310)
Return-on-assets ratio		-1.937	-2.669	-1.913	-2.645
		(1.753)	(1.775)	(1.753)	(1.775)
N	3124	3124	3124	3124	3124
R^2	0.003	0.008	0.037	0.009	0.038
Industry FE	No	No	Yes	No	Yes
Panel B. Dependent variable = 100×CAR[-1,1]					
Positive China-NA trade	-0.170	-0.453^b	-0.217	-0.328	-0.0871
	(0.160)	(0.186)	(0.196)	(0.201)	(0.212)
Positive China-NA trade × China import share from Japan				-9.387	-9.743^c
				(5.706)	(5.615)
China local sales share		-0.982	0.368	-0.697	0.666
		(1.356)	(1.371)	(1.391)	(1.407)
Log(market value)		0.205^a	0.205^a	0.204^a	0.204^a
		(0.0295)	(0.0306)	(0.0296)	(0.0306)
Market-to-book ratio		0.0615^b	0.0239	0.0623^b	0.0247
		(0.0303)	(0.0318)	(0.0304)	(0.0319)
Leverage ratio		-0.0894	-0.499^c	-0.0925	-0.505^c
		(0.264)	(0.301)	(0.264)	(0.301)
Return-on-assets ratio		-3.437^b	-4.142^b	-3.425^b	-4.130^b
		(1.705)	(1.708)	(1.705)	(1.708)
N	3026	3026	3026	3026	3026
R^2	0.000	0.017	0.036	0.017	0.036
Industry FE	No	No	Yes	No	Yes

Notes: This table shows the regression results of the event study for the trade war event on March 22, 2018. Panel A shows the results for the dependent variable of CRR[-1,1] while Panel B shows the results for CAR[-1,1]. Columns 1 to 3 show the baseline event study with different controls; Columns 4 to 5 show the results when we additionally include an interaction term. Positive China-NA trade is a dummy indicating whether the listed firm has affiliates in China that ever trade with North America in 2015 and 2016 fiscal years. China import share from Japan is the average ratio of import from Japan to China (aggregating all the Japanese affiliates in China) to total sales in 2015 and 2016 fiscal years. In Columns 2 to 5, we control China local sales share, which is the average ratio of local sales in China (aggregating all the Japanese affiliates in China) to total sales in 2015 and 2016 fiscal years. In Columns 3 and 5, we control industry FE according to divisions in Standard Industry Classification (SIC). In Columns 2 to 5, we also control the log market value, the market-to-book ratio, the leverage ratio, and the return-on-assets ratio. Robust standard errors in parentheses, c 0.10 b 0.05 a 0.01.

Table 7: Placebo test - China Stock Market Crash 2016

	(1)	(2)	(3)	(4)	(5)	(6)
Dep.Var:		CRR[Jan/4,Jan/13]			CAR[Jan/4,Jan/13]	
Positive CHN-NA trade	-0.0229[a]	-0.00130	0.00141	-0.0162[a]	-0.00226	-0.00178
	(0.00290)	(0.00323)	(0.00362)	(0.00578)	(0.00645)	(0.00736)
China local sales share		-0.0834[a]	-0.0571[b]		-0.0610[b]	-0.0414
		(0.0218)	(0.0227)		(0.0277)	(0.0286)
Log(market value)		-0.00771[a]	-0.00809[a]		-0.00390[a]	-0.00419[a]
		(0.000590)	(0.000618)		(0.000789)	(0.000839)
Market-to-book ratio		0.000389	-0.000437		0.00288[b]	0.00204
		(0.00104)	(0.00115)		(0.00113)	(0.00124)
Leverage ratio		-0.0103	-0.0136		-0.0156[b]	-0.0180[c]
		(0.00651)	(0.00848)		(0.00744)	(0.00940)
Return-on-assets ratio		-0.117[b]	-0.120[b]		-0.156[a]	-0.161[a]
		(0.0548)	(0.0555)		(0.0567)	(0.0573)
N	3011	3011	2928	2970	2970	2888
R^2	0.007	0.062	0.078	0.003	0.023	0.039
Industry FE	No	No	Yes	No	No	Yes

Notes: This table shows the results of the placebo test using the market crash in China in January 2016. The left panel shows the results for the dependent variable of CRR while the right panel shows the results for CAR. Positive China-NA trade is a dummy indicating whether the listed firm has affiliates in China that ever trade with North America in 2015 and 2016 fiscal years. In Columns 2, 3, 5, and 6, we control China local sales share, which is the average ratio of local sales in China (aggregating all the Japanese affiliates in China) to total sales in 2015 and 2016 fiscal years. In Columns 3 and 6, we control industry FE according to divisions in Standard Industry Classification (SIC). In Columns 2, 3, 5, and 6, we also control the log market value, the market-to-book ratio, the leverage ratio, and the return-on-assets ratio. Robust standard errors in parentheses, c 0.10 b 0.05 a 0.01.

A Appendixes

A.1 Robustness Checks for Difference-in-Differences Analysis

The following tables show the difference-in-differences results with different specifications for robustness checks. We separately use 2018q2 as the cutoff between pre-treatment and post-treatment (Table A.1); use $s = 0$ as the cutoff of the two treatment group (1) and (2) (Table A.2); use a longer sample period covering 2016q1-2018q3 (Table A.3); and use levels of dependent variables instead of logs (Table A.4).

Table A.1: Differences-in-Differences Robustness: Post-treatment after 2018q2

Dependent Var. (logs)	Total Sales (1)	Local Sales (2)	Sales to Japan (3)	Sales to Third (4)	Investment (5)	Labor (6)
China $\times \mathbf{1}(s < 0.03) \times \mathbf{1}(t \geq 2018q2)$	0.00770	0.0291^a	-0.00905	-0.0320^a	0.0173	-0.0394^a
	(0.00965)	(0.0108)	(0.00964)	(0.0107)	(0.0118)	(0.00516)
China $\times \mathbf{1}(s \geq 0.03) \times \mathbf{1}(t \geq 2018q2)$	-0.0692^a	-0.0671^b	-0.0428	-0.0544^b	-0.0312	-0.0419^a
	(0.0224)	(0.0340)	(0.0296)	(0.0234)	(0.0314)	(0.00987)
Affiliate FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-QoY FE	Yes	Yes	Yes	Yes	Yes	Yes
N	26523	26523	26523	26523	26523	25898
R^2	0.964	0.963	0.956	0.955	0.791	0.995

Notes: This table shows the results of the DID analysis using the period of 2018q2 and after as the post-treatment period. We take the log of each dependent variable in the regression. s is the average ratio of trade with North America to total sales in 2015 and 2016 fiscal years of the affiliate. We control affiliate FE, year-quarter FE, and country-QoY (quarter of the year) FE. We restrict the sample to the period of 2017q1 to 2018q3. Standard errors clustered at affiliate level: c 0.1, b 0.05, a 0.01.

Table A.2: Differences-in-Differences Robustness: $s = 0$ as the Cutoff for Two Treatment Groups

Dependent Var. (logs)	Total Sales (1)	Local Sales (2)	Sales to Japan (3)	Sales to Third (4)	Investment (5)	Labor (6)
China $\times \mathbf{1}(s = 0) \times \mathbf{1}(t \geq 2018q1)$	0.0132	0.0337^a	-0.00381	-0.0285^a	0.0131	-0.0379^a
	(0.00892)	(0.00946)	(0.00844)	(0.00970)	(0.0105)	(0.00455)
China $\times \mathbf{1}(s > 0) \times \mathbf{1}(t \geq 2018q1)$	-0.0189	0.00701	-0.0270	-0.0506^a	0.00795	-0.0385^a
	(0.0140)	(0.0172)	(0.0203)	(0.0165)	(0.0194)	(0.00802)
Affiliate FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-QoY FE	Yes	Yes	Yes	Yes	Yes	Yes
N	26523	26523	26523	26523	26523	25898
R^2	0.964	0.963	0.956	0.955	0.791	0.995

Notes: This table shows the results of the DID analysis using $s = 0$ as the cutoff of Japanese affiliates' exposure to trade with NA. s is the average ratio of trade with North America to total sales in 2015 and 2016 fiscal years of the affiliate. The affiliates with $s = 0$ are put in the treatment group (1) with no trade with NA; the affiliates with $s > 0$ are put in the treatment group (2) with positive trade with NA. We take the log of each dependent variable in the regression. We control affiliate FE, year-quarter FE, and country-QoY (quarter of the year) FE. We restrict the sample to the period of 2017q1 to 2018q3. Standard errors clustered at affiliate level: c 0.1, b 0.05, a 0.01.

Table A.3: Differences-in-Differences Robustness: Longer Sample Periods

Dependent Var. (logs)	Total Sales (1)	Local Sales (2)	Sales to Japan (3)	Sales to Third (4)	Investment (5)	Labor (6)
China $\times \mathbf{1}(s < 0.03) \times \mathbf{1}(t \geq 2018q1)$	0.0112	0.0462^a	-0.0177^c	-0.0364^a	0.0253^b	-0.0468^a
	(0.00964)	(0.0103)	(0.00943)	(0.0102)	(0.0103)	(0.00651)
China $\times \mathbf{1}(s \geq 0.03) \times \mathbf{1}(t \geq 2018q1)$	-0.0548^c	0.00264	-0.0595	-0.0960^a	-0.0277	-0.0554^a
	(0.0280)	(0.0338)	(0.0382)	(0.0332)	(0.0275)	(0.0122)
Affiliate FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-QoY FE	Yes	Yes	Yes	Yes	Yes	Yes
N	41575	41575	41575	41575	41575	40613
R^2	0.953	0.954	0.947	0.944	0.754	0.987

Notes: This table shows the results of the DID analysis using a longer sample period of 2016q1 to 2018q3. We take the log of each dependent variable in the regression. s is the average ratio of trade with North America to total sales in 2015 and 2016 fiscal years of the affiliate. We control affiliate FE, year-quarter FE, and country-QoY (quarter of the year) FE. Standard errors clustered at affiliate level: c 0.1, b 0.05, a 0.01.

Table A.4: Differences-in-Differences Robustness: Levels

Dependent Var. (levels)	Total Sales (1)	Local Sales (2)	Sales to Japan (3)	Sales to Third (4)	Investment (5)	Labor (6)
China $\times \mathbf{1}(s < 0.03) \times \mathbf{1}(t \geq 2018q1)$	-0.153	1.232	-0.132	-1.253^a	-0.0463	-52.54^a
	(0.988)	(0.927)	(0.230)	(0.252)	(0.110)	(9.135)
China $\times \mathbf{1}(s \geq 0.03) \times \mathbf{1}(t \geq 2018q1)$	-5.174^b	-2.075	-1.279	-1.819^a	-0.118	-62.46^a
	(2.550)	(1.591)	(0.794)	(0.417)	(0.152)	(15.81)
Affiliate FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Country-QoY FE	Yes	Yes	Yes	Yes	Yes	Yes
N	41575	41575	41575	41575	41575	40613
R^2	0.976	0.977	0.910	0.940	0.512	0.988

Notes: This table shows the results of the DID analysis using levels of each dependent variable instead of logs. s is the average ratio of trade with North America to total sales in 2015 and 2016 fiscal years of the affiliate. We control affiliate FE, year-quarter FE, and country-QoY (quarter of the year) FE. We restrict the sample to the period of 2017q1 to 2018q3. Standard errors clustered at affiliate level: c 0.1, b 0.05, a 0.01.

A.2 Extensions of Difference-in-Differences Analysis

The following tables show the heterogeneous impact of the US-China trade war on Japanese affiliates. Table A.5 shows how import share from Japan leads to heterogeneous impact of the trade war; Table A.6 shows how the number of siblings leads to heterogeneous impact of the trade war.

Table A.5: Heterogeneous Impact: Import Share from Japan

Dependent Var. (logs)	Total Sales (1)	Local Sales (2)	Sales to Japan (3)	Sales to Third (4)
China $\times \mathbf{1}(s < 0.03) \times \mathbf{1}(t \geq 2018q1)$	0.0156^{c}	0.0349^{a}	-0.00524	-0.0269^{a}
	(0.00922)	(0.00957)	(0.00899)	(0.0100)
China $\times \mathbf{1}(s \geq 0.03) \times \mathbf{1}(t \geq 2018q1)$	-0.0388^{b}	-0.0101	-0.0217	-0.0652^{b}
	(0.0177)	(0.0267)	(0.0202)	(0.0277)
China $\times \mathbf{1}(s < 0.03) \times \mathbf{1}(t \geq 2018q1) \times Import_{Japan}$	-0.0288	-0.0132	0.00452	-0.0264
	(0.0222)	(0.0332)	(0.0287)	(0.0274)
China $\times \mathbf{1}(s \geq 0.03) \times \mathbf{1}(t \geq 2018q1) \times Import_{Japan}$	-0.0835	-0.0825	-0.121	-0.00349
	(0.0951)	(0.125)	(0.142)	(0.0944)
Affiliate FE	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes
Country-QoY FE	Yes	Yes	Yes	Yes
N	26523	26523	26523	26523
R^2	0.964	0.963	0.956	0.955

Notes: This table shows the results of the DID analysis when we additionally include the interaction of the DID term and the import share from Japan. s is the average ratio of trade with North America to total sales in 2015 and 2016 fiscal years of the affiliate. $Import_{Japan}$ is the average ratio of import from Japan to total purchases in 2015 and 2016 fiscal years. We control affiliate FE, year-quarter FE, and country-QoY (quarter of the year) FE. We restrict the sample to the period of 2017q1 to 2018q3. Standard errors clustered at affiliate level: c 0.1, b 0.05, a 0.01.

Table A.6: Heterogeneous Impact: Number of Siblings

Dependent Var. (logs)	Total Sales (1)	Local Sales (2)	Sales to Japan (3)	Sales to Third (4)
China $\times \mathbf{1}(s < 0.03) \times \mathbf{1}(t \geq 2018q1)$	0.0155^{c}	0.0383^{a}	-0.00743	-0.0326^{a}
	(0.00936)	(0.0100)	(0.00922)	(0.0102)
China $\times \mathbf{1}(s \geq 0.03) \times \mathbf{1}(t \geq 2018q1)$	-0.0463^{c}	-0.0192	-0.0343	-0.0536^{c}
	(0.0239)	(0.0305)	(0.0321)	(0.0275)
China $\times \mathbf{1}(s < 0.03) \times \mathbf{1}(t \geq 2018q1) \times N(siblings)$	-0.000738	-0.00130	0.000722	0.000868
	(0.000822)	(0.000984)	(0.000973)	(0.00114)
China $\times \mathbf{1}(s \geq 0.03) \times \mathbf{1}(t \geq 2018q1) \times N(siblings)$	-0.00118	-0.000874	-0.00144	-0.00210
	(0.00105)	(0.00214)	(0.00120)	(0.00227)
Affiliate FE	Yes	Yes	Yes	Yes
Year-quarter FE	Yes	Yes	Yes	Yes
Country-QoY FE	Yes	Yes	Yes	Yes
N	26523	26523	26523	26523
R^2	0.964	0.963	0.956	0.955

Notes: This table shows the results of the DID analysis when we additionally include the interaction of the DID term and the number of siblings. s is the average ratio of trade with North America to total sales in 2015 and 2016 fiscal years of the affiliate. The number of siblings is the number of affiliates in other Asian economies that belong to the same parent firm. We control affiliate FE, year-quarter FE, and country-QoY (quarter of the year) FE. We restrict the sample to the period of 2017q1 to 2018q3. Standard errors clustered at affiliate level: c 0.1, b 0.05, a 0.01.

A.3 Extensions of Event Study

The following tables show the extensions of the event study. In Table A.7, we use China-NA trade share instead of a dummy of positive China-NA trade; in Tables A.8 and A.9, we respectively examine the effects of two trade war events on June 18, 2018 and May 5, 2019.

Table A.7: Stock Market Response to Trade War - China-NA trade share

	(1)	(2)	(3)	(4)	(5)
Panel A. Dependent variable = 100×CRR[-1,1]					
China-NA trade share	-59.86^b	-44.17	-35.67	-11.44	-3.287
	(28.92)	(30.29)	(29.31)	(23.22)	(21.49)
China-NA trade share × China import share from Japan				-1833.4	-1814.2
				(1318.1)	(1228.9)
China local sales share		-3.847^a	-1.324	-3.690^a	-1.169
		(1.436)	(1.440)	(1.431)	(1.440)
Log(market value)		0.0820^a	0.0876^a	0.0809^a	0.0864^a
		(0.0300)	(0.0308)	(0.0300)	(0.0308)
Market-to-book ratio		-0.0305	-0.0632^c	-0.0303	-0.0629^c
		(0.0320)	(0.0338)	(0.0320)	(0.0338)
Leverage ratio		-0.297	-0.936^a	-0.301	-0.942^a
		(0.273)	(0.309)	(0.273)	(0.310)
Return-on-assets ratio		-1.820	-2.625	-1.820	-2.625
		(1.752)	(1.775)	(1.752)	(1.775)
N	3124	3124	3124	3124	3124
R^2	0.002	0.006	0.036	0.007	0.037
Industry FE	No	No	Yes	No	Yes
Panel B. Dependent variable = 100×CAR[-1,1]					
China-NA trade share	-45.77	-45.06	-40.09	-31.25	-26.47
	(29.19)	(28.64)	(28.01)	(28.96)	(27.50)
China-NA trade share × China import share from Japan				-774.1	-763.1
				(1216.3)	(1165.0)
China local sales share		-1.498	0.424	-1.431	0.490
		(1.288)	(1.316)	(1.294)	(1.325)
Log(market value)		0.192^a	0.199^a	0.192^a	0.198^a
		(0.0287)	(0.0295)	(0.0287)	(0.0295)
Market-to-book ratio		0.0637^b	0.0247	0.0637^b	0.0249
		(0.0303)	(0.0318)	(0.0303)	(0.0318)
Leverage ratio		-0.0846	-0.506^c	-0.0865	-0.509^c
		(0.264)	(0.300)	(0.264)	(0.300)
Return-on-assets ratio		-3.365^b	-4.116^b	-3.365^b	-4.116^b
		(1.704)	(1.708)	(1.704)	(1.708)
N	3026	3026	3026	3026	3026
R^2	0.001	0.017	0.037	0.017	0.037
Industry FE	No	No	Yes	No	Yes

Notes: This table shows the regression results of the event study for the trade war event on March 22, 2018, using continuous China-NA trade share as the independent variable. Panel A shows the results for the dependent variable of CRR[-1,1] while Panel B shows the results for CAR[-1,1]. Columns 1 to 3 show the baseline event study with different controls; Columns 4 to 5 show the results when we additionally include an interaction term. China-NA trade share is the average ratio of China's trade with North America (aggregating all the Japanese affiliates in China) to total sales in 2015 and 2016 fiscal years. China import share from Japan is the average ratio of import from Japan to China (aggregating all the Japanese affiliates in China) to total sales in 2015 and 2016 fiscal years. In Columns 2 to 5, we control China local sales share, which is the average ratio of local sales in China (aggregating all the Japanese affiliates in China) to total sales in 2015 and 2016 fiscal years. In Columns 3 and 5, we control industry FE according to divisions in Standard Industry Classification (SIC). In Columns 2 to 5, we also control the log market value, the market-to-book ratio, the leverage ratio, and the return-on-assets ratio. Robust standard errors in parentheses, c 0.10 b 0.05 a 0.01.

Table A.8: Stock Market Response to Alternative Trade War Event on June 18, 2018

	(1)	(2)	(3)	(4)	(5)
Panel A. Dependent variable = 100×CRR[-1,1]					
Positive China-NA trade	-0.792[a]	-0.484[b]	-0.172	-0.395	-0.0805
	(0.186)	(0.217)	(0.219)	(0.242)	(0.246)
Positive China-NA trade × China import share from Japan				-6.792	-6.879
				(9.311)	(9.359)
China local sales share		-3.978[a]	-2.620[c]	-3.775[b]	-2.413[c]
		(1.479)	(1.427)	(1.502)	(1.450)
Log(market value)		-0.0498	-0.0501	-0.0505	-0.0510
		(0.0315)	(0.0328)	(0.0315)	(0.0328)
Market-to-book ratio		-0.0970[a]	-0.108[a]	-0.0965[a]	-0.108[a]
		(0.0278)	(0.0301)	(0.0278)	(0.0301)
Leverage ratio		-0.577[b]	-1.102[a]	-0.579[b]	-1.106[a]
		(0.258)	(0.288)	(0.258)	(0.288)
Return-on-assets ratio		3.977[b]	3.297[c]	3.985[b]	3.304[b]
		(1.687)	(1.684)	(1.687)	(1.684)
N	3124	3124	3124	3124	3124
R^2	0.004	0.018	0.043	0.018	0.044
Industry FE	No	No	Yes	No	Yes
Panel B. Dependent variable = 100×CAR[-1,1]					
Positive China-NA trade	-0.545[a]	-0.351[c]	-0.103	-0.335	-0.0854
	(0.179)	(0.207)	(0.211)	(0.231)	(0.236)
Positive China-NA trade × China import share from Japan				-1.208	-1.332
				(8.240)	(8.266)
China local sales share		-3.076[b]	-1.997	-3.040[b]	-1.957
		(1.337)	(1.303)	(1.369)	(1.334)
Log(market value)		-0.00694	-0.00775	-0.00707	-0.00793
		(0.0307)	(0.0322)	(0.0308)	(0.0322)
Market-to-book ratio		-0.0544[c]	-0.0627[b]	-0.0543[c]	-0.0626[b]
		(0.0281)	(0.0305)	(0.0281)	(0.0306)
Leverage ratio		-0.526[b]	-0.956[a]	-0.526[b]	-0.957[a]
		(0.248)	(0.278)	(0.248)	(0.278)
Return-on-assets ratio		2.202	1.601	2.203	1.602
		(1.555)	(1.550)	(1.556)	(1.550)
N	3072	3072	3072	3072	3072
R^2	0.002	0.008	0.027	0.008	0.027
Industry FE	No	No	Yes	No	Yes

Notes: This table shows the regression results of the event study for the trade war event on June 18, 2018, when Trump asked the US Trade Representatives to identify $200 billion worth of Chinese goods for 10 percent additional tariffs. Panel A shows the results for the dependent variable of CRR[-1,1] while Panel B shows the results for CAR[-1,1]. Columns 1 to 3 show the baseline event study with different controls; Columns 4 to 5 show the results when we additionally include an interaction term. Positive China-NA trade is a dummy indicating whether the listed firm has affiliates in China that ever trade with North America in 2015 and 2016 fiscal years. China import share from Japan is the average ratio of import from Japan to China (aggregating all the Japanese affiliates in China) to total sales in 2015 and 2016 fiscal years. In Columns 2 to 5, we control China local sales share, which is the average ratio of local sales in China (aggregating all the Japanese affiliates in China) to total sales in 2015 and 2016 fiscal years. In Columns 3 and 5, we control industry FE according to divisions in Standard Industry Classification (SIC). In Columns 2 to 5, we also control the log market value, the market-to-book ratio, the leverage ratio, and the return-on-assets ratio. Robust standard errors in parentheses, c 0.10 b 0.05 a 0.01.

Table A.9: Stock Market Response to Alternative Trade War Event on May 5, 2019

	(1)	(2)	(3)	(4)	(5)
Panel A. Dependent variable = 100×CRR[-1,1]					
Positive China-NA trade	-2.951^{a}	-0.974^{a}	-0.482	-0.458	0.0458
	(0.273)	(0.324)	(0.323)	(0.351)	(0.350)
Positive China-NA trade × China import share from Japan				-40.81^{a}	-41.40^{a}
				(12.50)	(12.44)
China local sales share		-10.08^{a}	-7.652^{a}	-8.697^{a}	-6.238^{a}
		(2.157)	(2.079)	(2.120)	(2.044)
Log(market value)		-0.522^{a}	-0.516^{a}	-0.529^{a}	-0.523^{a}
		(0.0386)	(0.0393)	(0.0385)	(0.0392)
Market-to-book ratio		0.231^{a}	0.173^{a}	0.233^{a}	0.176^{a}
		(0.0287)	(0.0305)	(0.0288)	(0.0306)
Leverage ratio		-0.237	-1.092^{a}	-0.242	-1.107^{a}
		(0.297)	(0.320)	(0.296)	(0.319)
Return-on-assets ratio		0.137	-1.216	0.188	-1.170
		(1.825)	(1.770)	(1.823)	(1.768)
N	3043	3043	3043	3043	3043
R^2	0.036	0.123	0.163	0.127	0.167
Industry FE	No	No	Yes	No	Yes
Panel B. Dependent variable = 100×CAR[-1,1]					
Positive China-NA trade	-2.341^{a}	-0.718^{b}	-0.475	-0.301	-0.0572
	(0.243)	(0.289)	(0.291)	(0.310)	(0.312)
Positive China-NA trade × China import share from Japan				-33.19^{a}	-33.04^{a}
				(10.48)	(10.58)
China local sales share		-6.520^{a}	-5.128^{a}	-5.338^{a}	-3.943^{b}
		(1.970)	(1.932)	(1.958)	(1.922)
Log(market value)		-0.443^{a}	-0.419^{a}	-0.448^{a}	-0.425^{a}
		(0.0374)	(0.0385)	(0.0374)	(0.0384)
Market-to-book ratio		0.372^{a}	0.314^{a}	0.375^{a}	0.316^{a}
		(0.0332)	(0.0349)	(0.0333)	(0.0350)
Leverage ratio		-0.198	-0.497	-0.202	-0.508
		(0.294)	(0.321)	(0.294)	(0.320)
Return-on-assets ratio		1.559	0.637	1.599	0.671
		(1.918)	(1.864)	(1.918)	(1.863)
N	2979	2979	2979	2979	2979
R^2	0.025	0.129	0.148	0.131	0.151
Industry FE	No	No	Yes	No	Yes

Notes: This table shows the regression results of the event study for the trade war event on May 5, 2019, when Trumpsaidthat the US would increase tariffs on $200 billion worth of Chinese goods from 10 percent to 25 percent. Panel A shows the results for the dependent variable of CRR[-1,1] while Panel B shows the results for CAR[-1,1]. Columns 1 to 3 show the baseline event study with different controls; Columns 4 to 5 show the results when we additionally include an interaction term. Positive China-NA trade is a dummy indicating whether the listed firm has affiliates in China that ever trade with North America in 2015 and 2016 fiscal years. China import share from Japan is the average ratio of import from Japan to China (aggregating all the Japanese affiliates in China) to total sales in 2015 and 2016 fiscal years. In Columns 2 to 5, we control China local sales share, which is the average ratio of local sales in China (aggregating all the Japanese affiliates in China) to total sales in 2015 and 2016 fiscal years. In Columns 3 and 5, we control industry FE according to divisions in Standard Industry Classification (SIC). In Columns 2 to 5, we also control the log market value, the market-to-book ratio, the leverage ratio, and the return-on-assets ratio. Robust standard errors in parentheses, c 0.10 b 0.05 a 0.01.