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Fishing in Troubled Waters:
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This study investigates trade diversion in Vietnam, driven by the US-China trade war, which provided Vietnamese firms with relatively favorable access to the US market. Analyzing US import data, we observe a substantial rise in imports of targeted goods from Vietnam due to the trade war. Utilizing microdata from Vietnamese firms, we establish empirical evidence that tariff hikes on Chinese products augmented the likelihood of Vietnamese firms in targeted industries becoming exporters. Employing tariff wedges as an instrumental variable, our findings indicate that firms transitioning into exporters witnessed a significant increase in productivity.

Keywords: trade diversion, trade war, export, foreign direct investment

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I. Introduction

In 2018, the United States (US) initiated several waves of import tariff increases on Chinese products, followed by retaliatory tariff increases by China. The series of tariff increases imposed by both US and China against each other in 2018 and onwards are generally termed "the US-China trade war." The trade war between the two largest world economies has brought massive attention to its immediate and long-term effects on the US, China, and other related economies. Extensive research has shown that the trade war negatively affected the US economy (Fajgelbaum et al. 2020; Huang et al. 2019; Handley Kamal, and Monarch 2019; Flaaen, et al. 2019). Similarly, on China's side, it is estimated that the US-China trade war led to a decrease in the output of textiles and computers (Guo et al. 2019), reduction in real wages (Guo et al. 2018), and decline in economic welfare (Bollen and Rojas-Romagosa 2018).

Although the US-China trade war damaged both economies in the short run, it may have benefited some emerging economies that can produce similar products and export them to the US through trade diversion. The concept of trade diversion was first introduced by Jacob Viner (1950) that if a country applies the same tariff to all trading partners, it would import products from the most efficient producer. However, if a lower (higher) tariff is imposed on one country, imports from that country would increase (decrease), but those from the rest of the world would decrease (increase).

Vietnam has emerged as a significant beneficiary of the trade war, as highlighted by numerous analysts. The trade conflict's targeting of Chinese goods, which are also consumed and produced in Vietnam, has positioned the country favorably (Tuan et al., 2018; Lam and Nguyen, 2019). Vietnam presents an appealing option for foreign investors due to several factors, including its low labor costs, ongoing efforts in administrative reform, attractive tax benefits for foreign firms, and its proximity to China. Consequently, it is hypothesized that the US-China trade war would not only boost exports but also attract Foreign Direct Investment (FDI) in Vietnam. Multinational firms in targeted industries would potentially relocate out of China or seek alternative locations as a diversification strategy to address the increased uncertainty.

Though many aggregate statistics show sharp increases in Vietnam's export to the US[1] and FDI[2] after the trade war, there also exists views that Vietnam cannot easily replace China's position in the global supply chain due to the sheer size of China. Moreover, concerns exist regarding China rerouting its products through Vietnam to circumvent increased tariffs, which could result in increased export volume for Vietnam but without significant impact on Vietnamese firms' production and exportation.

Several recent studies, using approaches based on general equilibrium models, provided predictions that some countries other than US and China would be positively affected by the trade dispute (Balistreri et al. 2018; Bellora and Fontagne 2019; Bolt et al. 2019). However, to the best of our knowledge, no study has investigated the effects of the US-China trade war on a non-participant country's exportation and firms' responses using microdata. The study aims to fill the gap in the literature by providing first empirical evidence using product-level trade data and large firm level micro data in Vietnam between 2017 and 2019.

First, the study elaborates whether the increased export from Vietnam to the US is due to an increase in export volume of those products, targeted by the series of tariff increases. Specifically, the study estimates the impact of tariff increases implemented at eight-digit Harmonized Tariff Schedule (HTS) by the US on the volume of Vietnamese products imported into the US measured at ten-digit HTS. In addition, the study examines whether Vietnam experienced any concurrent increase in imports of the targeted products from China or a decrease in export of those targeted products to the other major trading partner, Japan. The findings demonstrate that the significant increase in export was primarily driven by the increased volume of goods rather than changes in unit prices.

Then, we examine sources of increase in Vietnam's export to the US focusing on two factors: the emergence of new exporters and FDI (Foreign Direct Investment) recipients. Exportation is typically driven by a small number of firms (Bustos, 2007; Lileeva and Trefler, 2010; Melitz, 2003), and in the context of Vietnam, FDI is closely linked to firms' exportation. To investigate how Vietnam's relative increase in access to the US market affected Vietnamese firms' entry into the export market and foreign

[1] Vietnam's exports to the US increased 27.3% in the first half of 2019. Compared to figures in 2018, exports of mobile phones and mobile phone components more than doubled, while exports of computers increased by 79% in 2019 (Ha and Nguyen 2019).

[2] According to the Vietnam Ministry of Planning and Investment, the total registered FDI increased by 7.2% to 38 billion USD in 2019, compared to that in 2018, with the increase in newly-registered projects by 27% to 3,883 projects.

investment on them, the study employs three rounds of Vietnam Enterprise Survey (VES) from 2017 to 2019. The VES provides detailed firm demographics, information on FDI, and firms' export activities.

As a measure of increased access to the US market, we calculate industry-level differences in US import tariffs applied to Chinese and Vietnamese products. These differences in tariffs are weighted by pre-trade war share of Chinese products out of total imports of those products into the US within each industry. The measure is designed to capture the new opportunities opened to the firms in the non-participant countries that can produce and provide similar products targeted by the US-China trade war.

The identification strategy using the aforementioned measure of tariff differences on firm behaviors has several advantages. The sharp difference in tariffs between Chinese and Vietnamese products imported into the US is created by political and economic context in the US and China and is hardly related to Vietnam's economy or its industry structure. The exogeneity of the measure provides a unique opportunity to examine how firms respond to the increased access to the foreign market in the context of trade diversion, which deserves growing attention.

Using tariff differences as an exogenous shock, we estimate and show that Vietnamese companies in the targeted industry are more likely to be exporters by 0.3% points and FDI exporters by 0.2% points. These are sizable effects, given that the share of exporters and FDI exporters were only 2.24% and 1.19% in 2017, right before the start of the trade war. Furthermore, our empirical findings indicate that the US-China trade war increased foreign investment by 0.7% and the firms' export volume by 3%. Importantly, these increases are driven by few FDI companies (2.5% of the sample) and exporters (2.1% of the sample).

Then, we empirically examine the productivity of those Vietnamese firms who became an exporter due to the trade war. We employ aforementioned wedges in the tariffs as an instrumental variable for exportation, which allows us to estimate causal impact of exportation on firm productivity in the context of trade war and trade diversion. We employ several measures of productivity using reported revenue reflecting both increase in product price and quantity produced. As a measure of TFP (Total Factor Productivity), we employ the methodology suggested by Ackerberg-Caves-Frazer (ACF) (Ackerberg, Caves, and Frazer 2015).

We employ instrumental variable estimation and find out that being an exporter raises labor productivity and TFP by 1.48 and 1.798 log points, respectively, which corresponds to approximately 1.07 and 0.87 standard deviations of labor productivity and TFP. Furthermore, we report that being an exporter supported by FDI has even greater effects on firm-level labor productivity and TFP although results may suffer from potential weak instrument problem. The estimated results further highlight that a 1% increase in exportation increases labor productivity and TFP by 0.136% and 0.162%. These findings remain robust when employing alternative measures of productivity based on methodologies suggested by Woodridge (Woodridge 2009), Olley Pakes (OP) (Olley and Pakes 1996) and Levinsohn Petrin (LP) (Levinsohn and Petrin 2003). Based on findings reported using product-level microdata, we interpret the results as evidence showing that being a new exporter in the middle of the trade war has significantly positive impacts on output increases.

The findings in the study are closely related to the trade literature, which provides ample evidence of the effect of improved access to foreign markets on firms' export decision (Bernard, Jensen, and Schott 2003; Lileeva and Trefler 2010; and Verhoogen 2008; and Bustos 2011). All the studies showed the effect of tariffs on firm behavior; however to date, no study has examined the effect of tariff changes on firms' export behavior in non-participant countries, that is, trade diversion. The vast majority of studies on the trade diversion effect have been quantitative in the context of Free Trade Areas (FTAs) using country level analysis with inconsistent findings (Dai and Zylkin 2014; Matto and Ruta 2017; Clausing 2001; Magee 2008). This study contributes to the literature by providing evidence of trade diversion using product-level data, while also shedding light on how firms responded within such a dynamic environment.

In the context of developing countries such as Vietnam, export is closely related to FDI. Our findings are closely related to the concept of "export-platform FDI," introduced by Motta and Norman (1996)[3], which is characterized by establishing FDI and then exporting to non-participant markets rather than selling the final output in the home country or host country markets. Lower trade cost towing to factors such as the existence

[3] Following Motta and Norman (1996), the term "export-platform FDI" was further developed by Greenaway and Kneller (2007), Ekholm, Forslid, and Markusen (2007), and Ito (2013).

of a free trade agreement or a free trade zone in a host country, is the main reason for export-platform FDI.

A growing body of literature is recognizing the relationship between export, FDI, and firm productivity. Both theory and empirical studies in literature provide no consistent answer to this question. Theoretically, the learning-by-exporting hypothesis argues that firms are likely to learn and adopt more advantageous technologies to compete in foreign markets (Grossman and Helpman 1991; Yeaple 2005; Bustos 2011). Conversely, the hypothesis of the self-selection claims that productivity growth drives exports, due to the fixed cost of entry into the highly competitive export market, as discussed by Roberts and Tybout (1997) and Melitz (2003).

The study contributes to the literature by providing how the joint decision to become an exporter, supported by FDI affects firms' productivity in the short run within the context of trade diversion. The existing empirical literature has extensively investigated the relationship between exports and productivity, yielding mixed findings depending on the sample periods and countries under examination (Clerides et al., 1998; Bernard and Jensen, 1999 and 2004; Baldwin and Gu, 2003; Biesebroeck, 2005; and De Loecker, 2007). Additionally, the literature does not provide a consensus regarding the relationship between FDI and productivity (Doms and Jensen, 1998; Hallward-Driemeier et al., 2002; Kiyota, 2006; Aitken and Harrison, 1999; and Globerman et al., 1994).

The rest of the paper is organized as follows. Section 2 presents the overview of the US-China trade war. Section 3 discusses the effect of US-China trade war on Vietnam's export. Section 4 presents our main empirical results about the impact of the US-China trade war on Vietnamese firms' exportation and FDI, while Section 5 is devoted to the impacts of exportation and FDI on firm productivity. Section 6 presents conclusions and suggests directions for further study.

II. The US-China Trade War and Vietnam

Donald Trump's presidency was marked by the implementation of protectionist measures, although he was not the first US president to adopt such policies. Throughout his term, he initiated numerous trade conflicts, including the US-China trade war. He

attempted to renegotiate existing free trade agreements, such as the North American Free Trade Agreement and the US-Korea Free Trade Agreement and withdrew from the Trans-Pacific Partnership negotiations. However, the gravity of the US-China trade war was unprecedented due to the size of the two economies and the potential impacts on the global supply chain.

In 2017, the first year of Donald Trump's presidency, the two economies were each other's largest trading partners. In January 2018, the US announced tariffs on solar panels and washing machines; the US imported approximately 8% of its solar panels from China in 2017. In March 2018, the US additionally increased tariffs on aluminum, iron, and steel from all countries. The product-specific tariffs increases were the only prelude to subsequent tariff increases, mostly on Chinese products imported into the US.

[Table 1 to be Inserted Here]

Table 1 shows the timeline of the US-China trade war in 2018 and 2019. The first two waves targeted products and affected all goods imported into the US, regardless of their origins. The subsequent four waves of the war targeted Chinese products imported into the US, creating a sharp wedge in tariffs between goods from China and those from other countries. The table also shows the number of Chinese products and the number of Vietnamese products with the same ten-digit HTS[4] code. The volume of Vietnamese goods affected was smaller than that of the Chinese products targeted because not all targeted Chinese imports had equivalent Vietnamese products in the same ten-digit HTS category during our sample period.

The tariff differences presented in Table 1 are defined as each wave's unweighted average differences in tariffs applied to Chinese and Vietnamese imports to the US. It should be noted that the products that Vietnam does not export to the US were not excluded from the calculation. The positive number implies that higher tariffs were imposed on Chinese goods on average. Prior to the trade war, there were no differences between tariffs imposed on Chinese and Vietnamese products because both countries were on the Most Favored Nation (MFN) list. However, four waves of China tariffs sharply increased the tariff imposed on Chinese products, which became much higher compared to those imposed on Vietnamese products.

[4] United States uses a ten-digit HTS code to classify products, with the first six digits being the HS codes that are common, as established by the World Customs Organization (WCO).

After the first two waves of the trade war in early 2018, China retaliated by imposing tariffs on imports from the US, including cars and soybeans. In May, China agreed to reduce the US' trade deficit by importing more agricultural products from the US. In June, Trump declared that the US would impose a 25% tariff on $ 50 billion worth of Chinese goods, starting July 6, 2018, which caused, on average, a 23.96 percentage point (pp) difference between the actual tariffs imposed on Chinese and Vietnamese goods imported to the US. We denote this event as China 1. Vietnam's 439 products exported to the US became relatively cheaper than the Chinese products. The last three columns of Table 1 show that Vietnam's export of the targeted goods increased from 1.2 billion in 2017 to 1.7 billion in 2019. In August, the US, again, imposed a 25% tariff on Chinese goods causing, on average, a 22.97pp gap between 161 goods from China and those from Vietnam, China 2. Both China 1 and China 2 waves were followed by China's retaliatory tariff increases on American products of similar trade volumes.

The scale of the trade war expanded in September 2018 when the US declared a 10% tariff on approximately $200 billion worth of Chinese goods. The wave targeted 8,539 Chinese products and affected 2,176 products that Vietnam exports to the US, causing, on average, a 7.23pp difference between the tariffs applied to Chinese and Vietnamese goods. In March 2019, the U.S. Department of Commerce stated that in 2018, the U.S. trade deficit with China was the highest ever recorded. In May 2019, the previous 10% tariffs on $200 billion worth of Chinese goods increased to 25%. Thereafter, at a G20 Osaka Summit, the leaders of the two economies announced a truce in the trade war; however, this truce did not last a month. In September 2019, the two countries imposed new and higher tariffs on each other's products, targeting 5,628 Chinese products and affecting 2,011 Vietnamese products that were exported to the US during our sample period.

[Figure 1A to be Inserted Here]

[Figure 1B to be Inserted Here]

Figures 1A and 1B also visually present the differences between US tariffs on Chinese and Vietnamese products during the trade war and before the onset of the COVID-19 pandemic. Figure 1A visually shows the differences in average statutory tariffs imposed on Vietnamese and Chinese goods. The positive figure implies that tariffs on Chinese products are higher than tariffs on Vietnamese products, as shown in Table 1. As Figure

1A depicts statutory tariffs, later exemptions on specific products were incorporated when calculating the tariff differences. Conversely, Figure 1B shows the difference in tariffs caused by the trade war without considering later exemptions and relaxations. Ignoring later exemptions might be more informative if relevant economic agents recognize the trade war as a permanently increased uncertainty related to targeted Chinese products imported into the US. Figures 1A and 1B show that each trade war wave targeting Chinese products created a sharp increase in the difference in tariffs. The tariff differences decreased in the second half of 2019 as some products were later exempted.

III. The Effect of the US-China Trade War on Vietnam's Exports

A. Data and Empirical Strategy

Data construction.—We acquired data on statutory tariffs for the period 2017–2019 and the effective date of change in each tariff on Chinese products from the US International Trade Commission. The data includes the eight-digit and ten-digit HTS level of targeted products, timeline when tariff changes went into effect, and increased tariffs as well as later exemptions and relaxations. We constructed tariff data at ten digit HTS for goods imported monthly from China and Vietnam, whereby the changed tariffs were incorporated from the calendar month of the effective date[5].

Monthly import data collected at ten-digit HTS is provided by the US Census Bureau. Further, we employed the cost, insurance, and freight (CIF)[6] value of monthly imports in USD value as well as quantity, unit value, and duty inclusive unit value[7] reported at the ten-digit HTS. Tariff and imports data are merged at the month-ten-digit HTS level for our analyses in this section. To prevent any confounded impacts of the Covid-19 pandemic, we restricted our sample up to the end of 2019.

[5] Our primary analyses remained robust as we incorporated changed tariffs from the subsequent month after the effective date.

[6] The cost, insurance, and freight (CIF) value indicates the value of goods imported, including cost, insurance, and freight but excluding duties.

[7] The US Census Bureau notes that the duty calculated using the data might not accurately reflect the amount of duty paid, and the data should be interpreted cautiously. The portion of products assembled or processed in the US could be eligible for duty exemptions causing an overstatement of the figures. Conversely, no duty is calculated when there are several duty rates at various levels, thereby underestimating the statistics.

Empirical strategy. —To estimate the impact of the US-China trade war on Vietnam's exportation of the same products to the US, we employed the dynamic difference in differences (DID) as follows:

$$Y_{im} = \alpha + \sum_{l=1}^{6} \beta_l Pretrends_{im}^{l} + \sum_{k=0}^{8+} \gamma_k Tariff_{im}^{k} + HS8_j + Month_m + \varepsilon_{im} \quad (1)$$

where Y_{im} is statistics of Vietnamese products imported into the US, with ten-digit HTS code "*i*" in month "*m*" measured as log of value, quantity, unit value, and duty-inclusive unit value, all measured in USD. The main variables of interest are $Tariff_{im}^{k}$ indicating that a Chinese product with the same ten-digit HTS code "*i"* was hit by tariff increase "*k*" months earlier. Therefore, γ_k captures the evolution of the impact of tariff increases on equivalent Vietnamese products over time. *k* ranges from zero to eight where more than eight months from the effective date is top-coded. $Pretrends_{im}^{l}$ are indicators that hs products with the same ten-digit HTS code "i" would experience tariff increase "*l*" months later. The value of "*l"* ranges from one to six.

By construction, all the estimated coefficients of $Pretrends_{im}^{l}$ and $Tariff_{im}^{k}$ capture the movement of outcome variables around the effective date of tariff increases relative to the baseline period, which is set to at least seven months before the month of the effective date. As most tariff increases were implemented at eight-digit HTS level, we also included eight-digit HTS fixed effects ($HS8_j$) to control for differences in products across eight-digit HTS categories. Monthly fixed effects are included to capture common time trends. Finally, error terms ε_{im} were clustered within each eight-digit HTS category.

B. Main empirical results

[Figure 2 to be Inserted Here]

Four graphs in Figure 2 visually present the estimated coefficients of pre-trends (β_l) as well as those of dynamic DID (γ_k). The horizontal axis in each graph represents months relative to tariff enactment, where "zero" denotes the month of the effective date. In all four graphs, the green dotted line represents estimated coefficients while the red and blue dotted lines represent upper and lower bounds of the 95% confidence interval,

respectively. We multiplied both coefficients and standard error by 100 when making graphs; therefore, these graphs show us, in terms of percentages, how the effects of tariff enactment evolve around the time of tariff increases.

The upper left graph in Figure 2 demonstrates the movement of coefficients for the log of Vietnamese imports into the US measured in USD. It shows that Vietnamese imports started to increase three months after the tariff increases targeting equivalent Chinese products. The increase in import volume remains statistically significant even after eight months of tariff increases. The magnitude of the impact implies that, on average, Vietnam's exports to the US more than doubled within six months of tariff increases. The estimated impact is significant but consistent with simple descriptive statistics on some major exporting goods.[8]

The other three graphs in Figure 2 present estimated coefficients for the logs of quantity, unit value, and duty-inclusive unit value to identify the sources of increased import volume further. The upper right graph shows that most increases in the import volume from Vietnam are caused by increased quantity. Import volume measured in general quantity sharply increased from the fourth month of enactment of new tariff, which is consistent with the movement of import volume measured in USD. The increased quantity persists even after eight months, although estimates become less accurate in later months. The lower left graph also shows a significant increase in unit value by approximately 40%, while the lower right graph shows an almost identical pattern in duty-inclusive unit value, which confirms that this increase in unit value is not driven by duty. The estimates provided in this section suggest that the market swiftly responded to the trade war by seeking alternative imports from Vietnam to substitute Chinese products."

C. Robustness test

China's export to Vietnam.—In this subsection, we show the robustness of the main results by examining the trade volume from China to Vietnam. One developing country

[8] ITC Trade Map (https://www.trademap.org/Index.aspx) shows that Vietnam more than doubled its cellphone exports to the US in 2019, compared to 2017 and 2019. Most of Vietnam's cell phone production is done by Samsung, accounting for approximately 25% of total Vietnamese exports to the United States at the onset of the trade war. Vietnam also exported 30% more shoes to the US in 2019 than that in 2017.

may not replace the enormous pre-trade-war volume from China to the US in the short run. Therefore, the increase in Vietnam's export to the US since the trade war raised suspicion that a portion of its exports is a detour export from China seeking to dodge the tariffs[9].

This possibility can be easily seen in Table A2 in Online Appendix, which shows China's export to Vietnam (A) and Vietnam's export to the US (B). Among products in category (A), the share of products targeted by the trade war was only 0.11% in 2018; however, this share increased to 26.80% as the trade war expanded. The volume of imports from China to Vietnam also steadily increased from 2017 to 2019. Approximately 90% of products in category (B) are also included in category (A), showing that China and Vietnam are competitors in the export market and implying that Vietnam could be used as a new platform for Chinese products heading for the US.

To test whether increased Vietnamese export to the US in the previous section are driven by Chinese products detour through Vietnam, we used the annual trade flow from UN COMTRADE collected at the six-digit HS, while most tariff increases against Chinese products were implemented at the eight-digit HTS level. As such, we constructed the three measures of the trade war at six-digit HS code: the share of products under China tariffs, share of products under China tariffs in terms of trade volume, and tariffs against Chinese products weighted by Vietnam's export to the US. Then, we estimated the impacts of the trade war on export from China to Vietnam using the specification as follows:

$$Y_{it} = \alpha + \beta China\ Tariff_{it} + \gamma Vietnam\ Tariff_{it} + HS6_i + Year_t + \varepsilon_{it} \quad (2)$$

where Y_{it} is China's export to Vietnam at six-digit HS code *i* in year *t*. The coefficient of $China\ Tariff_{it}$ is one of the three measures we constructed capturing the impacts of the trade-war, while Vietnam's tariffs against Chinese products ($Vietnam\ Tariff_{it}$) were controlled. We also included fixed effects at six-digit HS code and year. Error terms were clustered within each HS6 code to address autocorrelation.

[9] The detoured products from China to Vietnam is very likely to put Vietnam on the "watch list" of US trade policymakers and can be subject to the higher tariff imposed by the US in the future.

[Table 2 to be Inserted Here]

In regressions (1), (2), and (3), we restricted the product samples to those in both categories (A) and (B), defined in Table A2. In regressions (4), (5), and (6), we examined all the products that are exported from China to Vietnam, even though some of them were not Vietnam's exports to the US. In all regressions, estimates show no significant association between the measure of the US-China trade war and export volume from China to Vietnam[10].

Vietnam's exports to Japan.—We are yet to conclude that total Vietnam exports increased as it is difficult to exclude the possibility that by increasing its export to the US, Vietnam decreased its exports to other major trading partners. Vietnam's three major trading partners for its export are the US, China, and Japan.

We sampled monthly import data on Vietnamese products from Japan's customs from 2017 to 2019 to investigate whether Vietnam's export to Japan was affected during the trade war. Though Japan's customs provides up to nine digits of disaggregated trade statistics, only the first six digits are consistent with international classifications and can be matched with the data of tariff lines related to the US-China trade war. Therefore, we constructed the same three measures of the trade war at the six-digit HS (the share of products under China tariffs, the share of products under China tariffs in terms of trade volume, and tariffs against Chinese products weighted by Vietnam's export to the US) as in subsection 3.3.1. Then, we estimated the impact of the trade war on Vietnam's export to Japan as follows:

$$Y_{im} = \alpha + \beta China\ Tariff_{im} + \gamma Japan\ Tariff_{im} + HS6_i + Month_m + \varepsilon_{im} \quad (3)$$

where Y_{im} is Vietnam's export of product i to Japan in month m. Further, Japan's tariffs against Vietnamese goods, as well as at the six-digit HS and monthly fixed effects, were controlled. Error terms were clustered within each HS6 code.

[10] All the regressions reported in Table 2 remain robust when we control for the MFN tariffs rather than the preferential tariff for Chinese products. In case some products lacked preferential tariffs for Chinese imports, we employed MFN tariffs instead.

Table A3 in the Online Appendix presents the estimates from Equation (3) using three different measures of the trade war on two different samples: A: products whose HS6 code belongs to both (1) Vietnam's export to Japan and (2) Vietnam's export to the US and B: all the products exported from Vietnam to Japan. In all regressions, estimates show no significant changes in Vietnam's export to Japan when products are targeted by the US-China trade war. The empirical exercise in Table A3 shows that we cannot reject the null hypothesis that Vietnam's increased exports to the US did not involve the reduction in its exports to other major trading partners.

IV. The Effect of the US-China Trade War on Vietnamese Firms

A. Vietnam Enterprise Survey and Summary Statistics

To analyze the impact of the trade war on firms, we employed three rounds of VES annually conducted by the General Statistical Office, which covers firms across all industries. VES covers a population of state-owned companies, FDI companies, and registered companies with more than 100 employees. VES also includes a representative sample of smaller firms with less than 100 employees selected based on three levels of stratification[11]. Overall, the survey contains detailed information on more than 500,000 firms each year.

Three rounds of VES collected in 2017, 2018, and 2019 are employed as they provide detailed firm demographics and information on FDI and firms' export activities. For the pre-trade-war period, we only used the 2017 wave, as the 2016 wave does not report firms' exportation. We also excluded data from 2020 onward to avoid the confounding effects of the pandemic. VES reports each firm's industry using a five-digit Vietnam Standard Industrial Classification (VSIC).[12] To merge VES with US tariff lines defined in each industry, we paired the three-digit VSIC with the equivalent three-digit ISIC[13].

[11] Firms with less than 100 employees were selected through random sampling within three levels of stratification: four-digit industry, number of employees, and region. Refer to the Appendix for a more detailed description of the VES data.

[12] The 2017 wave classified industries using the Vietnam Standard Industrial Classification 2007 (VSIC 2007), while the 2018 and 2019 waves employed Vietnam Standard Industrial Classification 2018 (VSIC 2018).

[13] As VSIC is based on ISIC, most industries could be easily matched without any modification. Table A1 in the Appendix provides information on further concordance made in other cases.

The unique tax identifier is used to identify firms across different waves. We excluded observations with missing tax codes (991 observations, 0.035% of the sample), missing industry codes (1,100 observations, 0.039% of the sample), and negative values for total sales or fixed assets (6,116 observations, 0.219% of the sample). We also eliminated outliers with main variable values greater than eight standard deviations from the mean. [14]

For the amount of FDI, we utilized information on total invested foreign direct capital reported in each fiscal year and the accumulated amount of foreign direct capital invested by the end of each fiscal year. We also identified exporters as firms who reported having made transactions with foreign partners and received revenue from these transactions.

[Table 3 to be Inserted Here]

Table 3 highlights the role of FDI in exportation and employment among Vietnamese firms. Extremely few firms receive FDI; only 15,221 firms received FDI in 2017, accounting for 2.71% of all firms. The figure increased to 17,017 firms in 2019, while its share of all firms declined to 2.48%. However, this small number of FDI firms account for slightly more than 50% of all exporters; the share of FDI firms slightly increased from 53.01% in 2017 to 54.96% in 2019. Further, more than 50% of export volume was attributed to FDI firms. Lastly, FDI firms employ a considerable share of workers in Vietnam's economy, accounting for approximately 20% of all employed workers during our sample period.

In Table A4, we compare FDI exporters, domestic exporters, and FDI non-exporters to domestic non-exporters. We define domestic firms as firms that do not have any FDI as a source of finance. We regress four performance indicators -sales, employment, fixed capital, and wage bill in a logarithm- on indicators of firm type as well as province and three-digit industry fixed effects. A domestic non-exporter whose indicator is not included as a regressor serves as a baseline group to compare estimated coefficients.

Table A4 clearly shows that both domestic and FDI exporters tend to have sales that are more outstanding. FDI exporters and domestic exporters also hired more workers, thus paid more, while post-estimation in regression (3) and (4) show that compared to

[14] The main variables are sales, employment, spending on investment, total FDI, and total export value.

domestic exporters, FDI exporters pay even greater wage bills to workers and have larger amount of fixed capital. Further, FDI non-exporters exhibit greater sales, employment opportunities, fixed capital, and wage bills compared to domestic non-exporters. However, post-estimation shows that performance of these FDI non-exporters is significantly less than that of FDI exporters. Table A4 emphasizes the importance of both export activities and FDI in driving firms' performance and employment.

B. Construction of Weighted Tariff Difference

To understand the impacts of the US-China trade war on Vietnamese firms, we constructed an industry-level tariff measure that reflects both tariffs increases against Chinese imports to the US and its importance in the US market. We first attached the three-digit ISIC industry code to each ten-digit HTS code using concordance between ISIC and HS6 provided by the United Nations Statistics Division. Then, a measure of weighted tariff in industry *j* in year *t* is defined as follows:

$$\tau_{jt} = \sum_{k \in j} \Delta tariff_{kt} \times \omega_{jk} \qquad (4)$$

where $\Delta tariff_{kt}$ is the annual difference in tariffs on products *k* imported from China and Vietnam to the US. $\Delta tariff_{kt}$ is set as zero for the pre-trade-war period and for goods not targeted during the US-China trade war. Then, each tariff line is weighted by ω_{jk}, which is defined as the import share of product *k* from China to the US before the trade war as follows:

$$\omega_{jk} = \frac{V_{jk}^{C}}{V_j} \qquad (5)$$

where V_{jk}^{C} is the CIF value of the US imports from China measured at ten-digit HTS product line *k*, within the three-digit ISIC industry code *j*, in 2015[15], and V_j is the total CIF value of the US imports in industry *j* from all countries[16]. The weight is constructed

[15] Our results are robust when using the CIF value of US imports in 2016, compared to that of imports in 2015.

[16] The data for total US imports from all countries and from China in 2015 were obtained from the US Census Bureau website.

to capture the impact of the trade war in each industry (j) caused by a specific product that used to be imported from China (k). Then, this weighted tariff is summed for all the products in each three-digit industry codes.

The large, unexpected wedges in tariffs on imported goods from the two countries are created by the economic conflict between the US and China on the issue of trade deficit and intellectual property theft. Thus, the targeted products and the magnitude of tariff differences are not likely to be correlated with the demand for imported goods from Vietnam or supply-side changes in Vietnamese exporters. Following practices in empirical literature such as Bernard and Jensen (2004) and McCaig (2011), we also employed a pre-trade-war import share of each Chinese product of all US imports as a weight to make sure exogeneity of our tariff difference measure.

[Table 4 to be Inserted Here]

Table 4 presents the summary statistics of the weighted tariff differences during the trade war. On average, the highest weighted tariff differences were observed in the manufacturing sectors. There is a substantial variation in the weighted tariff difference, both across and within major industry[17] sectors. The manufacturing sectors exhibited the highest variation within sectors, with a standard deviation of the tariff difference reaching 2.47 percentage points in 2019.

C. The Impact of the US-China trade war on FDI and Export

To examine the impact of the US-China trade war on FDI and exportation, we restricted the sample to firms appearing in all survey rounds (2017, 2018, and 2019) and employed firm fixed effects to capture firm heterogeneity, as in Equation (6). This approach makes it possible to examine the impacts of the trade war on existing firms not confounded with firms' entry and exit[18].

$$Y_{ijt} = \alpha_0 + \alpha_1 \tau_{jt} + \gamma_p + \theta_t + \mu_j + \vartheta_i + \varepsilon_{ijt} \qquad (6)$$

[17] The largest tariff differences in 2018 were observed in manufacture of railway locomotives and rolling stock, manufacture of electric motor, and manufacture of wiring and wiring devices, while in 2019, manufacture of articles of fur and manufacture of furniture exhibited the largest tariff difference.

[18] We also conducted analysis without utilizing firm fixed effects on all firms allowing new entrants and exit. The results are similar to what we report and can be provided upon request.

The main variable of interest, τ_{jt}, is the weighted tariff difference defined in Equation (4) for each industry and year. The specification also includes the province γ_p, year θ_t, and three-digit industry μ_j fixed effects. Standard errors are clustered within a three-digit industry to account for heteroscedasticity and serial correlation in the error terms.

Equation (6) is estimated for four outcome variables: exporter indicator, FDI-exporter indicator, log of FDI value, and log of export value. FDI is accumulated FDI capital invested by the end of each fiscal year, whereas export volume is the annual value of export reported by the firm. Both values are deflated by Producer Price Index (PPI)[19] at the two-digit industry level.

[Table 5 to be Inserted Here]

The estimates presented in regressions (1) and (2) in Table 5 are statistically significant. To understand its magnitude, the coefficients are multiplied by the mean weighted tariff differences in row (A). It is observed that firms exposed to the US-China trade war are more likely to become exporters by 0.3% points and FDI exporters by 0.2% points. These are sizable effects considering the share of exporters and the share of FDI exporters before the trade war: only 2.24% and 1.19% in 2017. Additionally, it is revealed that 74% (=0.134/0.181) of the positive impact of tariff differences on firms' decision to become exporters is driven by FDI exporters."

In regressions (3) and (4), we further examined the impact of tariff differences on the amount of FDI and export volume. The estimated coefficients are all significant, and the magnitude is 0.007 for a log of FDI and 0.030 for a log of export volume when multiplied with mean weighted differences in tariffs in the targeted industry. The impact may appear small, as it implies, on average, a 0.7% increase in FDI and a 3% increase in export volume. However, these increases are driven by approximately 2.5% of FDI firms and 2.2% of exporters in 2018 as shown in Table 3. For FDI-receiving firms and exporters, the magnitude will be an approximate increase of 31.82% (0.7%/0.022) in FDI and 136.36% (3%/0.022) in export volume.

[Table 6 to be Inserted Here]

[19] In case PPI is not reported at the two-digit industry level, we employed PPI reported at the letter code of industry.

We further tested the estimation of Equation (6) on different samples in Table 6: firms with more than 100 employees. The estimates exhibit larger coefficients, as the share of the exporter and FDI firms are higher in the sample. The firms in the affected industry are 1.7% points more likely to be an exporter, corresponding to a 4.8% increase in the share of exporter. Moreover, the 53% (0.518/0.974) of the impact can be explained by an increase in FDI exporters. In regressions (3) and (4), the coefficients multiplied by the mean weighted difference in tariffs are 0.022 and 0.18, implying that the FDI received and export on average increased by 2.2% and 18%, respectively.

V. The Impact of Export on Productivity: Instrument Variable Estimation

It is widely known in the literature that exporting companies are more productive than non-exporters. Building upon the findings from the previous section, which indicated that the US-China trade war served as a catalyst for Vietnamese firms to enter and expand their export activities, this section aims to investigate whether firms that became exporters solely due to the trade war experienced improvements in productivity. By analyzing three years of data spanning from 2017 to 2019, we are able to observe the immediate impact on productivity when firms engage in exporting as a result of trade diversion.

A. Productivity Estimation

To investigate the impact of exportation on firms' productivity, we used two measures of productivity: labor productivity and TFP. Labor productivity is measured as the total sales per worker, whereas TFP is obtained as the residual in the production function of the firm's inputs and productivity. Both measures have been widely used in the literature to examine the effect of trade policies on firms' productivity. Lileeva and Trefler (2010) and McCaig and Pavcnik (2018) used labor productivity, whereas Amiti and Konings (2007) and De Loecker (2007) employed TFP measures in their studies.

To acquire firm-level TFP, we follow the approach in standard literature which assumes a firm with a Cobb-Douglas production function:

$$Y_{it} = A_{it} L_{it}^{\beta_l} K_{it}^{\beta_k} \qquad (7)$$

where output of firm *i* at time *t*, Y_{it}, is a function of labor $L_{it}^{\beta_l}$ and capital $K_{it}^{\beta_k}$. We assess whether A_{it} – the TFP of firm *i* at time *t*—is a function of firms' exportation status. Taking the natural logs of Equation (7), we obtain Equation (8), whereby logarithms are denoted by small letters as follows:

$$y_{it} = \beta_0 + \beta_l l_{it} + \beta_k k_{it} + \epsilon_{it} \qquad (8)$$

The productivity of firms A_{it} is now incorporated in the error term ϵ_{it}. A great number of methodologies have been developed in the literature to estimate Equation (8) and obtain unbiased estimates of TFP at the individual firm level. In this study, we apply the methodology developed by ACF (2015) for the main analysis and also provide robustness checks by using other measures such as OP (1996), LP (2003), and Woodridge (2009) in Online Appendix. The methodology developed by ACF (2015) offers a crucial advantage as it addresses the issue of collinearity, where labor appears both as a free variable and in the nonparametric polynomial approximation.

Specifically, we utilize the total sales at the firm level deflated by PPI, as the dependent variable. It should be noted that using sales instead of the physical amount produced allows the TFP measures to capture both increased prices and enhanced production efficiency. As these new Vietnamese exporters enter the market, they could sell their products at higher prices due to changes in market power and improved access to the global market. Moreover, the influx of significant capital to FDI exporters would also enable improvement in physical output due to transferred know-hows and shared network.

The total wage bill to employees and the value of a firm's fixed assets were employed as variables for labor and capital inputs. Importantly, we use the logarithm of electricity bill[20] as a proxy for unobserved time-varying productivity shock following ACF (2015). In this part, we restrict the sample to firms with more than 100 employees, because majority of small firms do not report their electricity bills[21]. We estimated the production

[20] Total payment to electricity is deflated by PPI for electricity, gas, steam, and air conditioning supply industry (industry D).
[21] Only 37.13% of firms with less than 100 employees reported their electricity bills, while 93.69 firms with more than 100 employees reported this information.

functions for firms in each two-digit industry separately[22]. The estimated production function across two-digit industries are reported in Table A5 in Online Appendix.

B. Empirical Strategy: Instrument Variable Estimation

The next step entails estimating the effect of export status on firms' productivity, using the US-China trade war as the instrument variable for exportation. The effects of exportation on firms' TFP are difficult to estimate due to several endogeneity issues such as simultaneous causality bias and omitted variable bias. The US-China trade war, measured as weighted tariffs, is a strong predictor for firms' exportation as reported in the previous section. Meanwhile, it caused an unexpected random shock to Vietnamese firms, as tariff rates targeted Chinese products and were not directly related to the Vietnamese economy making it an attractive instrument variable.

We employ equation (6) as a first stage to estimate the following second-stage equation:

$$productivity_{ijt} = \beta_0 + \beta_1 EX_{ijt} + \delta_p + \lambda_j + \sigma_t + \upsilon_i + \epsilon_{ijt} \qquad (9)$$

Our dependent variables are labor productivity and TFP. EX_{ijt} is the export status of firm *i* in industry *j* at time *t*. We separately estimated equations using different definitions of EX_{ijt} : exporter, domestic exporter, FDI exporter, and FDI non-exporter. We instrumented EX_{ijt} variable using weighted tariff differences τ_{jt}, as defined in Equation (4). Each export status was instrumented using weighted difference in tariffs using Equation (6). The province, industry, year, and firm fixed effect were employed, while standard errors clustered within each three-digit industry.

C. The Impact of Export Status on productivity

[Table 7 to be Inserted Here]

[22] There are 80 industries in total. The production function at the more disaggregated level cannot be estimated because the number of firm observations for these sectors was too small to allow for statistically sensible estimates.

The instrumental variable estimates for labor productivity outcomes are provided in Table 7. Regressions (1)-(4) reveal that being an exporter and FDI exporter results in an increase in labor productivity by 1.481 and 2.797 log points, respectively. Furthermore, TFP is enhanced by 1.798 and 3.197 log points when firms became exporters and FDI exporters. These effects are considerable, especially considering that one standard deviation of labor productivity and TFP, as measured using ACF (as reported in Table A6, Online Appendix), is 1.389 and 2.247 log points.

Regressions (4)-(8) indicate that a 1% increase in FDI and exportation resulting from the trade war has a significant positive impact on labor productivity, with an increase of 1.186% and 0.136%, respectively. Moreover, a 1% increase in exportation is found to improve TFP by 0.162%. However, caution is advised in interpreting the coefficients on the log of FDI, as the first-stage F-statistics are lower than the rule of thumb value of ten.

These findings are consistent with previous empirical studies, which found a positive relationship between export status and firms' productivity (Clerides et al., 1998, Biesebroeck, 2005, De Loecker, 2007, among many others). In case of TFP, the estimated magnitude is even larger than the average difference in TFP between exporter and non-exporters (1.02 log points) reported in Table A7 in Online Appendix. When compared to standard deviation of productivity measures reported in Table A6, being an exporter increases labor productivity by 1.07 standard deviations (=1.481/1.389) and increases TFP by 0.8 standard deviation (=1.798/2.247). Being an FDI exporter demonstrates even greater improvements in labor productivity, with a magnitude of 2.01 standard deviations, and in TFP, with a magnitude of 1.422 standard deviations.

We also report replication of Table 7 using alternative measures of TFP which have been widely employed in the literature: OP (1996), LP (2003) and Wooldridge (2009). Table A8 in [Online Appendix] presents that the results are similar to those in Table 7. Being an exporter immediately after the onset of the trade war increased TFP by 1.480, 1.420, and 2.023 log points when TFP is measured using three different methods aforementioned. The impact of being an FDI exporter leads greater impacts on TFP as shown previously. The amount of FDI and exportation also has significant impacts on TFP though statistical significance is weaker in the case of FDI.

The results presented in this section capture the short-run impact of the US-China trade war on Vietnamese firms through their exportation and FDI activities. The significant and

immediate impact on TFP and labor productivity, as observed, could be primarily attributed to the substantial increase in the quantity of products exported to the US, as reported in previous section using product level microdata, rather than an increase in the price of the output produced by these firms. We posit that such a remarkable surge in productivity in the short run was made possible due to the close substitutability of Vietnamese products with Chinese products targeted by the US. This close substitutability can be attributed to Vietnam's physical proximity to the Chinese supply chain.

Notably, being an FDI exporter has greater impacts than being an exporter on the TFP measured in different methods. Literature reports FDI's well-developed mechanisms for transferring information efficiently from one country to another before exporting (Caves, 1982; McFetridge and Corvari, 1986). Therefore, by entering export markets, these FDI firms are likely to have greater improvement in productivity in the short time.

VI. Conclusion

The recent escalation of economic conflict and uncertainty in the global supply chain has sparked increased interest in trade diversion, wherein trade barriers imposed against one country result in increased trade with other partners. We investigated and provided evidence of trade diversion using the 2018 US-China trade war as an exogenous shock that improved Vietnamese firms' position in the US import market. Using product-level data, the study reported that import of the products, targeted by US and produced in Vietnam, into the US sharply increased. As an underlying mechanism, the study also showed that the increased wedge in tariffs between Chinese and Vietnamese products boosted the likelihood that Vietnamese firms enter the export market and attract FDI. The study also highlighted heterogeneous responses to the trade war. The effect of the US-China trade war on the probability of being an exporter and FDI exporter were more salient for large firms probably due to their ability to pay the fixed entry cost. Finally, through instrumental variable estimation, we established that the act of becoming an exporter as a result of the trade war had a substantial positive impact on the productivity of Vietnamese firms.

Though the study only provides empirical evidence of trade diversion driven by the trade war in the extremely short time, we believe the findings reported in this study are meaningful as circumstances related to the global supply chain are rapidly changing. Nevertheless, more research would be required to understand to what extent the trade war affects firms in the non-participant countries in the longer horizon through their innovation and technological upgrading. A deeper understanding of the 2018 US-China trade war will have several important policy implications for many developing countries, which have been waiting for an opportunity to play a more important role in the global supply chain.

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Figures

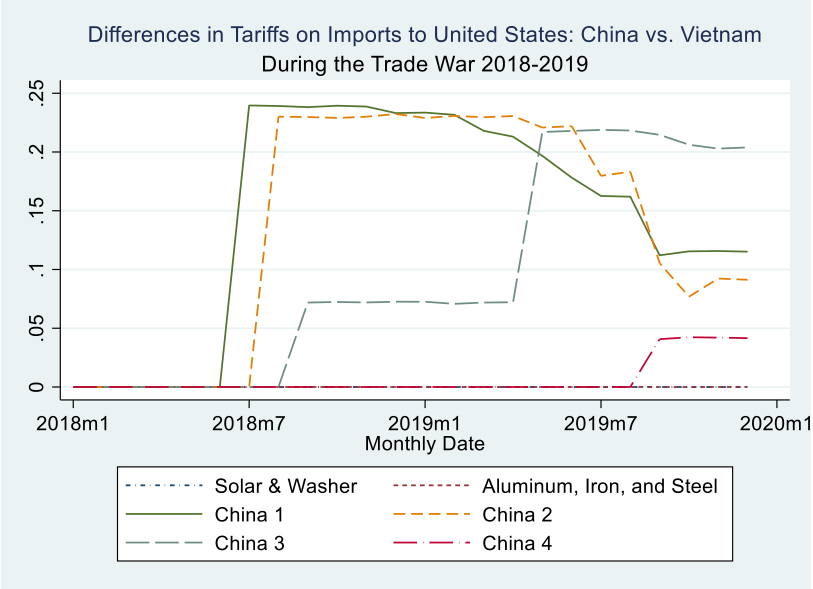

FIGURE 1A: DIFFERENCES IN TARIFFS IMPOSED ON CHINESE AND VIETNAMESE PRODUCTS

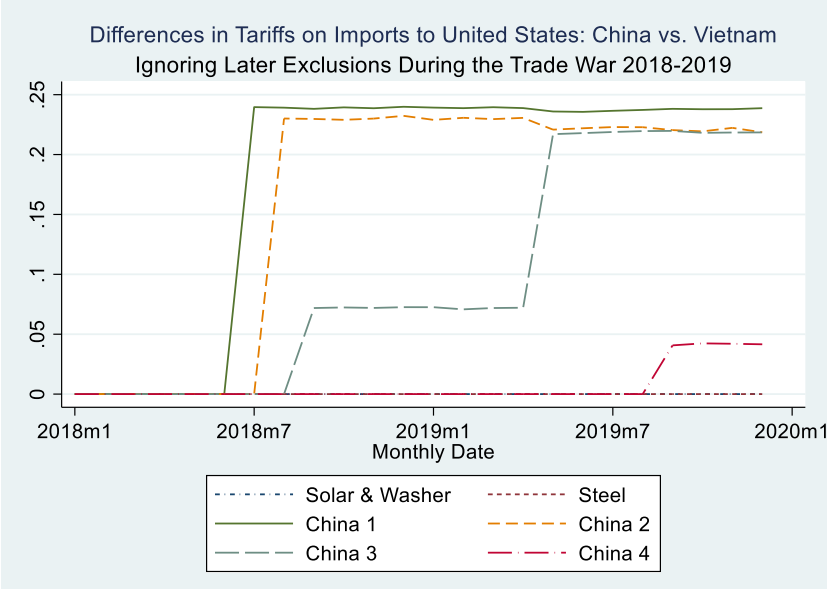

FIGURE 1B: DIFFERENCES IN TARIFFS IMPOSED ON CHINESE AND VIETNAMESE PRODUCTS
-IGNORING LATER EXEMPTIONS-

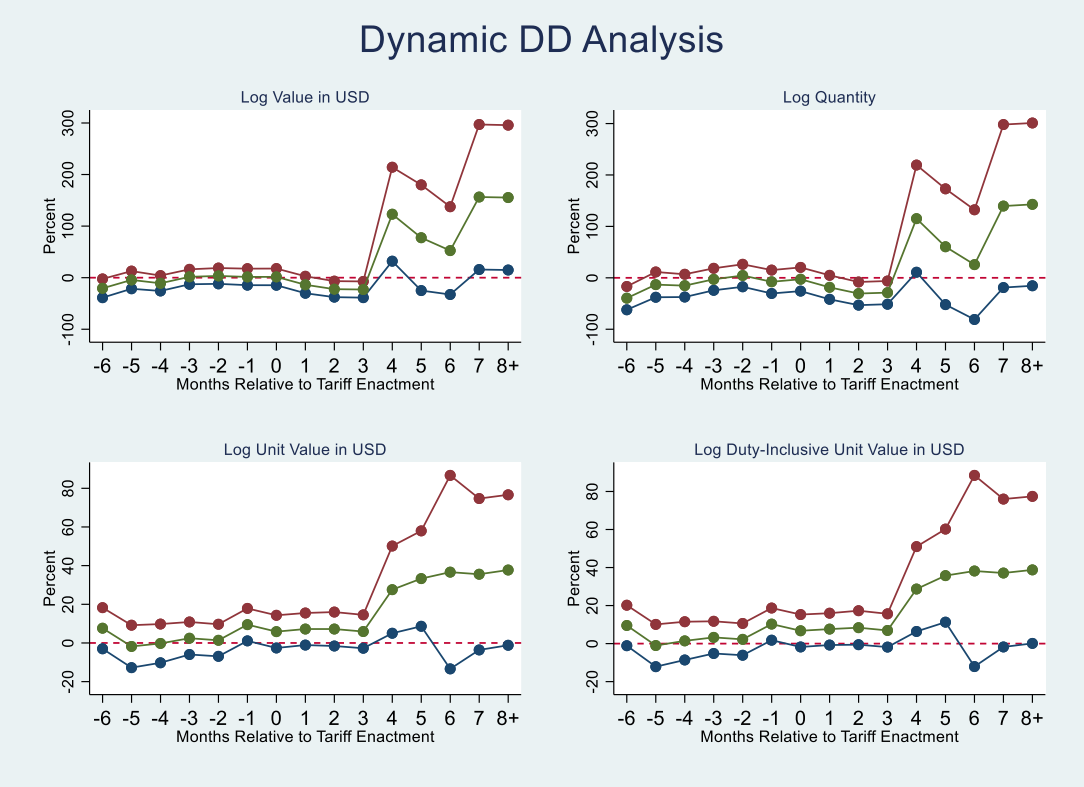

FIGURE 2 THE IMPACT OF TRADE WAR ON VIETNAM'S EXPORT TO THE UNITED STATES

Tables

TABLE 1: THE 2018–2019 TRADE WAR

Tariff wave	Date enacted	Chinese products targeted (#HS-10)	Vietnamese products affected* (# HS-10)	Tariff difference (% point)		Imports to United States (mil US$) from Vietnam		
				2017	Upon implementation	2017	2018	2019
Solar panels & Washing machines	Feb 7th, 2018	18	14	0	0	1,475	681	1,940
Aluminum, Iron, and Steel	Mar 23rd, 2018	578	138	0	0	665	1,000	601
China 1	July 6th, 2018	1,629	439	0	23.96	1,256	1,380	1,670
China 2	Aug 23rd, 2018	401	161	0	22.97	2,467	1,768	2,694
China 3	Sep 24th, 2018	8,539	2176	0	7.23	14,303	16,336	21,483
China 4	Sep 1st, 2019	5,628	2011	0	4.07	21,057	21,847	25,733

Note. Tariff difference is defined as each wave's unweighted average difference in tariffs applied to Chinese and Vietnamese imports. The positive number implies that on average, higher tariffs were imposed on Chinese products. The date enacted indicates the first date of tariff implementation during the trade war, ignoring later changes. The number of products is calculated among Vietnamese imports into the United States in 2018.

* In first two tariff waves, it indicates the number of Vietnamese products directly targeted, while it indicates the number of Vietnamese products indirectly affected as tariffs on Chinese products increase.

TABLE 2. THE IMPACT OF US-CHINA TRADE WAR ON EXPORT FROM CHINA TO VIETNAM 2017–2019

	Log (Export)					
	A: Products belong to both categories †			B: All products exported from China to Vietnam ‡		
US-China Trade War on Vietnam	(1)	(2)	(3)	(4)	(5)	(6)
The share of products under China tariffs (#)	0.266			-0.102		
	(0.637)			(0.205)		
The share of products under China tariffs (in USD)		0.549			-0.046	
		(0.522)			(0.199)	
Weighted tariffs			3.481			-0.029
			(3.211)			(0.895)
Vietnam's tariffs against China	√	√	√	√	√	√
Constant	6.959***	6.931***	6.737***	6.997***	6.995***	6.993***
	(0.072)	(0.066)	(0.231)	(0.037)	(0.037)	(0.041)
Observations	1,819	1,819	1,819	8,070	8,070	8,070
R-squared	0.376	0.377	0.377	0.397	0.397	0.397

Note. † These are products whose HS6 belong to both (1) China's export to Vietnam and (2) Vietnam's export to the United States
‡ These are all products exported from China to Vietnam. If products exported from China to Vietnam do not have matching HS6 exported from Vietnam to the US, we coded measures of US-China trade war as zero.
All specifications include Vietnam's tariffs imposed on Chinese imports, HS6, and year fixed effects. The error terms are clustered within HS6.

TABLE 3: THE ROLE OF FDI RECEIVING FIRMS IN VIETNAM'S EXPORT

Year	# of all firms	# of FDI firms (Share)	# of exporter (share)	# of FDI firms out of exporters (share)	The share of export by FDI firms (%)	The share of employment by FDI firms
2017	560,967	15,221 (2.71%)	12,540 (2.24%)	6,648 (53.01%)	51.35%	19.95%
2018	620,958	15,276 (2.46%)	13,388 (2.16%)	7,345 (54.86%)	63.03%	20.85%
2019	687,063	17,017 (2.48%)	14,727 (2.14%)	8,094 (54.96%)	51.26%	21.26%

Note. The numbers in the table are calculated using three rounds of the VES conducted from 2017 to 2019. Two survey questions were used to identify exporters during the sample period: (1) did the firm make selling or buying transactions with foreign partners? (2) what was the total payment that firms received from their foreign partners during the year?

TABLE 4: THE US IMPORT TARIFF DIFFERENCE AGAINST CHINESE AND VIETNAMESE PRODUCTS

Industry	# of industries	# of targeted industries	Mean tariff difference	Std. Dev
		Panel A: Year 2018		
All	227	77	0.0015	0.004
Agriculture	12	6	0.0004	0.0008
Manufacturing	70	61	0.0046	0.0064
Traded	89	76	0.0037	0.006
		Panel B: Year 2019		
All	227	89	0.0087	0.0180
Agriculture	12	7	0.0030	0.0057
Manufacturing	69	66	0.0266	0.0247
Traded	89	86	0.0219	0.0236

Note. Tariff difference is the weighted US import tariff difference between Vietnam and China due to trade war within three-digit industry code. For each commodity-line tariff difference, its weight is the share of HS ten-digit imported product from China to total imported products of US within three-digit industry based on 2015 US import. In 2017, the import tariff difference is zero due to the fact that it is before the trade war, and there is no difference in the US import tariffs between Vietnam and China in 2017. There are five industries affected by the trade war, but they do not belong to the traded sectors. These are: weapons and ammunition and military fighting vehicles manufacturing, postal activities, motion picture, video, television programmer activities, and other personal service activities.

TABLE 5: THE IMPACT OF THE US-CHINA TRADE WAR ON FDI AND EXPORT FIRM FIXED EFFECTS ESTIMATION ON ALL FIRMS IDENTIFIED IN ALL ROUNDS OF THE SURVEY

	(1) Exporter	(2) FDI Exporter	(3) Log (FDI)	(4) Log (Export)
The weighted difference in tariffs (A)	0.181***	0.134***	0.458**	2.016***
	(0.044)	(0.036)	(0.181)	(0.480)
Constant	0.026***	0.014***	0.166***	0.166***
	(0.000)	(0.000)	(0.000)	(0.001)
(A) multiplied by the mean weight difference in tariffs in the affected industry†	0.003	0.002	0.007	0.030
Observations	1,422,971	1,422,971	1,422,159	1,422,971
R-squared	0.779	0.863	0.958	0.814
Firm FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes

† The mean weighted difference in tariffs in the affected industry is 0.015.
Note. The table is estimated using three rounds of the VES conducted from 2017 to 2019. Standard errors are clustered at the three-digit industry level. Province and three-digit industry fixed effects are controlled in all regressions. Total sales and fixed assets are deflated by PPI at the two-digit industry level (if available) or a letter code level. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

TABLE 6: THE IMPACT OF THE US-CHINA TRADE WAR ON FDI AND EXPORT FIRM FIXED EFFECTS ANALYSIS ON FIRMS WITH MORE THAN 100 EMPLOYEES

	(1) Exporter	(2) FDI Exporter	(3) Log (FDI)	(4) Log (Export)
The weighted difference in tariffs (A)	0.974***	0.518***	1.249***	10.546***
	(0.213)	(0.152)	(0.404)	(2.171)
Constant	0.376***	0.211***	2.205***	2.879***
	(0.001)	(0.001)	(0.002)	(0.013)
(A) multiplied by the mean weight difference in tariffs in the affected industry†	0.017	0.009	0.022	0.180
Mean of dependent variable	0.355	0.198	2.073	2.723
Observations	43,130	43,130	43,107	43,130
R-squared	0.825	0.907	0.980	0.841
Firm FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes

† The mean weighted difference in tariffs in the affected industry is 0.017.
Note. See the note for Table 6. The sample is restricted to firms with more than 100 employees.

Table 7: EFFECT OF EXPORT STATUS ON FIRM PRODUCTIVITY: IV ESTIMATION

VARIABLES	(1) Labor Productivity	(2) ACF	(3) Labor Productivity	(4) ACF	(5) Labor Productivity	(6) ACF	(7) Labor Productivity	(8) ACF
Exporter	1.481***	1.798**						
	(0.516)	(0.877)						
FDI Exporter			2.797***	3.197**				
			(1.042)	(1.484)				
Log of FDI					1.186**	1.885		
					(0.486)	(1.156)		
Log of Export							0.136***	0.162**
							(0.045)	(0.074)
F-statistic in first-stage	21.43	18.80	12.27	11.65	9.64	4.17	24.37	21.08
Observations	42,858	40,297	42,858	40,297	42,838	40,297	42,858	40,297
R-squared	-0.670	-0.925	-0.926	-1.157	-2.829	-6.274	-0.298	-0.396
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note. Columns (1), (3), (5), and (7) are estimations using labor productivity, while Columns (2), (4), (6), and (8) are estimations using TFP from ACF methods. The table is estimated using three rounds of the Vietnamese Enterprise survey conducted from 2017 to 2019. The sample is restricted to firms with more than 100 employees. Standard errors are clustered at the three-digit industry level. Province, three-digit industry, and year-fixed effects are controlled in all regressions. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.