

The impact of the US-China trade war on Vietnamese exports to the US: a quantitative study using DiD approach

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Abstract

Purpose – The study attempts to examine the impact of the US-China trade war on Vietnamese exports to the United States, which has consistently served as a key market for Vietnamese goods and services in recent decades. The heterogeneous effects of the trade war on different export sectors are also evaluated.

Design/methodology/approach – The secondary data on Vietnamese exports to the US at a 6-digit level is collected from UN Comtrade. Besides, the difference-in-differences (DiD) method is employed to analyze the impact of the trade war on exports from Vietnam to the United States.

Findings – The findings revealed a 14% increase in total Vietnamese exports to the United States due to the trade war. Examining heterogeneous effects, certain industries, such as plastics, iron or steel articles, textiles and garments, and machinery and mechanical appliances, experience significant benefits. However, the study did not identify statistically significant effects on other sectors, such as electrical machinery products, agricultural and forestry, and furniture.

Originality/value – The paper is one among limited studies considering the causal effects of the trade war on a developing country, accounting for the heterogeneous effects on different export sectors.

Keywords The US-China trade war, Impact evaluation, Bystanders, Vietnamese exports to the United States, DiD

Paper type Research paper

Introduction

In recent decades, China has experienced a strong emergence and significant trade surplus with the United States, and as a result, has become a major threat to the influence and interests of the United States, not only in the Asia-Pacific region but also globally (Kafura, 2023). In 2018, in an effort to curb so-called unfair trade practices and intellectual property theft, the US government, under the administration of President Donald Trump, officially started the US-China trade war, with a focus on imposing additional tariffs on imported goods from China (USTR, 2018).

JEL Classification — F13, F14, F60

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The US-China trade war officially began on July 6, 2018, when the United States imposed an additional 25% tariff on US imports worth \$34 billion from China (Wong and Koty, 2020). The goods and services were in “List 1” under the US Section 301, which outlines increased import tariffs on Chinese products. Following “List 1”, the United States also introduced “List 2” covering \$16 billion worth of imports from China, effective on August 23, 2018. “List 3” became effective on September 24, 2018, imposing a 10% tariff on \$200 billion worth of Chinese goods, and later increased to 25% from May 2019. In August 2019, the United States announced plans to further increase tariffs on goods and services worth \$300 billion from China, divided into two phases: “List 4A” amounting to \$120 billion and “List 4B” amounting to \$180 billion. The \$120 billion worth of Chinese imports were subjected to a 15% tariff starting from September 1, 2019, and reduced to 7.5% from February 14, 2020, following the Phase 1 trade agreement reached between the United States and China in September 2019.

In response to the US tariff increases, China also raised tariffs from 5% to 25% on \$185 billion of US goods (Mullen, 2021). On February 14, 2020, the US-China Economic and Trade Agreement officially took effect. In this agreement, China committed to purchase an additional \$200 billion worth of US commodities while the United States agreed to modify its Section 301. So far, the United States has undergone four rounds of tariff increases and is currently imposing tariffs of 25% and 7.5% on \$250 billion and \$120 billion worth of goods from China, respectively (see Table 1).

The trade war between the two superpowers in the world not only affects the United States and China but also has significant impacts on third countries, including Vietnam (Amiti *et al.*, 2019; Escaith, 2021; Itakura, 2019). Pursuing an export-led growth strategy (Escaith, 2021) with a high level of trade openness (around 186% in 2022 according to the data of the World Bank), Vietnam is highly vulnerable to external shocks, including the US-China trade war. As the United States and China are major trading partners of Vietnam, the US-China trade war is expected to have considerable impacts on Vietnamese trade and economy.

More specifically, regardless of exports, the United States is the top importer of Vietnamese goods. Accounting for 20% of Vietnamese total export revenue in 2010, the United States has now risen to become the largest importing country of Vietnam worldwide, comprising one-third of Vietnamese total export value in 2022 (see Figure 1).

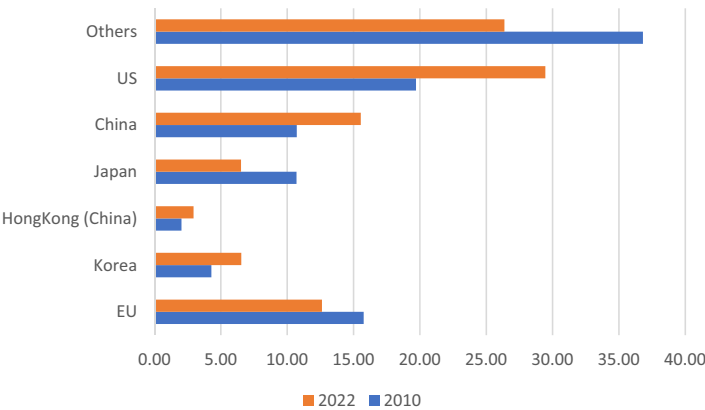
The main products that Vietnam exports to the United States are electrical machinery and equipment and parts thereof, textiles and garments, footwear, machinery and mechanical appliances, furniture, articles of leather, agricultural products, toys, plastics, games and sports requisites (see Table 2). Many experts believe that Vietnam has benefited greatly from this trade war as many Vietnamese goods and services can substitute Chinese products in the US market (Bhatnagar *et al.*, 2021; Choi and Nguyen, 2023). Therefore, increasing tariffs can contribute to boosting Vietnam's exports of these goods and services to the United States. On the other hand, scholars have pointed out potential risks of the trade on Vietnamese exports globally as well as to the United States in particular, as the United States might

List	Value	Date coming into effect	Tariff rate
List 1	\$34 billion	July 6, 2018	25%
List 2	\$16 billion	Aug 23, 2018	25%
List 3	\$200 billion	Sep 24, 2018	10%
		May 10, 2019	25%
List 4A	\$120 billion	Sep 01, 2019	10%
		Feb 24, 2020	7.5%
List 4B	\$180 billion	Canceled	

Source(s): Zhang and Huld (2022)

Table 1.
The US's additional
tariffs on Chinese
products under
Section 301

Figure 1.
Main markets of
Vietnamese
exports (%)



Source(s): Described by the authors based on the data from GSO, Vietnam

Table 2.
Main Vietnamese
products imported by
the United States
in 2022

HScode	Products	Export value(million USD)	Percent
HS03	Fish and crustaceans, mollusks and other aquatic invertebrates	1,390	1.3
HS39	Plastics and articles thereof	2,509	2.3
HS42	Articles of leather; saddlery and harness; travel goods, handbags and similar containers; articles of animal gut (other than silkworm gut)	1,484	1.4
HS44	Wood and articles of wood; wood charcoal	826	0.8
HS64	Footwear; gaiters and the like; parts of such articles	9,663	8.8
HS73	Iron or steel articles	1,179	1.1
HS84	Machinery and mechanical appliances, boilers, nuclear reactors; parts thereof	10,648	9.7
HS85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers; television image and sound recorders and reproducers, parts and accessories of such articles	38,970	35.6
HS94	Furniture; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings; lamps and lighting fittings, n.e.c.; illuminated signs, illuminated name-plates and the like; prefabricated buildings	10,038	9.2
HS95	Toys, games and sports requisites; parts and accessories thereof	2,063	1.9
HS07,08,20	Vegetables, fruits and nuts	1,090	1.0
HS50-63	Textiles and garments	18,455	16.9
Others	Others	11,145	10.2
TOTAL	Total commodities	109,460	100

Source(s): UN Comtrade

increase trade protection measures against Vietnamese goods due to concerns about Vietnam becoming a transit point for Chinese goods entering the US market (Tien *et al.*, 2019).

The article provides empirical evidence about the impact of the US-China trade war on bystanders, particularly a developing nation. Additionally, the difference-in-differences (DiD) method is employed to address endogeneity issues in causal impact assessments. Despite

several studies seeking to answer the impacts of the US-China trade war on Vietnam exports, quantitative studies focusing on measuring the effects of the trade war on overall Vietnamese exports and on exports from different sectors to the United States are rare. Most previous studies are qualitative, providing predictions about the impact of the trade war on Vietnamese exports (Ha and Phuc, 2019; Hoa, 2019; Lich, 2018). Scholarly opinions about the impact of the trade war are mixed, with some arguing that the trade war should bring opportunities to Vietnamese exports (Ha and Phuc, 2019; Samuel, 2020) while others predict a loss in exports (Hoa, 2019; Quan, 2019). Hence, more quantitative evidence should be provided to confirm the causal effects of the trade war on Vietnamese exports, in terms of the direction and the size of the effects as well as the heterogeneous impacts across sectors. Evidence should be important to Vietnam since it could inform government and policymakers to effectively formulate export orientation policies.

We chose the United States as the export market of interest since the United States is one of the largest markets in the world and has been the biggest market for Vietnamese exports in recent decades. Given the export-led growth that Vietnam has been pursuing as well as the major role of the US market, exports to the United States should significantly contribute to sustainable economic growth, poverty reduction and employment creation in Vietnam (Jenkins, 2004; Nguyen, 2016). The United States is a demanding market with high requirements for imported goods from foreign countries. Therefore, taking advantage of opportunities, including the US-China trade war, can help Vietnam enhance its competitive edge and increase exports to the United States in terms of both quality and quantity, thereby promoting sustainable exports and economic growth (Truong, 2024).

It is theorized that Vietnam should gain from the US-China trade war mostly because Chinese goods subject to higher tariffs from the United States are consumed and produced in Vietnam (John and Valentina, 2019). Hence, when the United States imposes higher tariffs on Chinese commodities, Vietnam could potentially substitute for China in the United States and gain by producing and exporting those commodities to the United States (Ha and Phuc, 2019). China, on the other hand, has been the biggest import market of Vietnam. And main exports of the United States subject to retaliatory tariffs from China such as soybeans, civilian aircraft and aircraft parts, are not commodities that Vietnam has competitiveness (USAFacts Team, 2023).

The results indicate that the US-China trade war, with increased import tariffs of the United States on Chinese goods, led to an increase in Vietnamese exports to the United States by 14%. However, the authors only found significant impacts of the trade war on certain key export sectors of Vietnam, such as machinery and mechanical appliances, textile and garments, plastics and iron or steel articles. The study did not identify statistically significant effects on other export sectors, for example, electronic machinery, agricultural products and furniture.

The rest of the paper is as follows. Section 2 reviews the literature; Section 3 presents the empirical model and research data; Section 4 provides results and discussion and the conclusion is in section 5.

Literature review

The traditional theory of international trade predicts the positive impact of trade liberalization on the import and export activities of countries (Viner, 2014). These positive effects are referred to as the trade creation effects. Accordingly, trade between countries will increase due to the reduction of tariff and non-tariff barriers between nations through bilateral and multilateral trade agreements (Mattoo *et al.*, 2022; Singh, 2021). Besides the effects of trade creation, there are trade diversion effects. Trade diversion emerges when members of free trade agreements (FTAs) reduce tariff and non-tariff barriers, resulting in a

decrease in trade with non-members since goods and services from non-members become relatively more expensive compared to those from member countries (Dai *et al.*, 2014). The theory predicts that during the US-China trade war, bilateral trade between the two countries decreases, whereas the United States and China import more from third countries (Steinbock, 2018).

Many empirical studies have attempted to assess the impact of the US-China trade war on the two nations as well as on the global economy (Itakura, 2019; Li *et al.*, 2018). For example, the study by Itakura (2019) used a general equilibrium and simulation method and found that the trade war reduced the GDP of the United States and China by 1.35% and 1.41%, respectively. Additionally, it caused a global GDP reduction of up to \$450 billion. In line with this, Li *et al.* (2018) pointed out that China was more affected by the trade war and incurred greater losses compared to the United States. Moreover, the authors also highlighted the importance of Mexico's involvement in the trade war, which led to a larger negative impact on the United States (Li *et al.*, 2018). Using a similar method, the estimates from Kumagai *et al.* (2021) showed that if both two countries applied a 25% tax on all imported goods from each other, the economic damage to the United States and China would be 0.4% and 0.5%, respectively. Using an input-output model to study the impact of the trade war, Wu *et al.* (2021) revealed the indirect losses of \$23 billion on the global economy, in which China and the United States incurred the most losses of \$10 billion and \$6.5 billion, respectively. Huemme *et al.* (2022) focused on assessing the impact of the US-China trade war on the liquefied natural gas market and found a significant decline in natural gas trade between the United States and China but no overall economic impact on the two nations.

Other quantitative studies have concentrated on measuring the impacts of the trade war on third-party countries (Kumagai *et al.*, 2021; Wu *et al.*, 2021). Fajgelbaum *et al.* (2021) investigated the effects of the trade war on the export opportunities of bystanders and found that trade war increases the exports of taxed goods and services from third-party countries into the rest of the world (neither China nor the United States). A study on the impacts on Asian countries indicated that some Asian nations, notably Taiwan, Thailand and South Korea, are likely to be negatively affected the most by the trade war (Kumagai *et al.*, 2021). For OECD countries, the EU, Canada and Mexico are among the most affected nations, with losses ranging from \$700 million to \$1.7 billion, and these losses could increase up to 70% in the case of 100% tariff through (Wu *et al.*, 2021). In line with the result of Wu *et al.* (2021), a study by Mao and Görg (2020) suggested that the EU, Canada and Mexico are largely affected by the trade war, with a total damage of up to \$1 billion. Examining Thailand, Nidhiprabha (2019) utilized a vector autoregressive model and highlighted the negative impact of the trade war on Thailand's production and exports to key markets. In addition, the study indicated that the decline in China's economy could exert downward pressure on global commodity prices, hence, reducing Thailand's exports more significantly (Nidhiprabha, 2019).

The heterogeneous impacts of the trade war are also being examined by scholars. Using data from companies listed in 40 countries, Benguria (2023) found out that, although firms in general experienced declines in revenue, profit and amount of capital, firms in different regions and firms with different sizes were affected dissimilarly by the trade war. Likewise, Anh and Anh (2023) found a greater impact of the trade war on larger and domestic companies compared to smaller and foreign companies. Using the global value chain analysis method, Bo *et al.* (2022) studied multinational companies in the ITC industry. The results showed that the extent of the impact on each company depends on the position and level of involvement of companies in the value chain (Bo *et al.*, 2022). Also investigating the impact of the trade wars on the global value chain, Mao and Görg (2020) revealed a more significant impact on downstream industries in the supply chain.

Some studies have investigated the spill-over effects of the US-China trade war on various sectors and areas of the economy. For example, Benguria (2023) explored the impact of the

trade war on supply chains and found that companies in Europe and the United States operating in industries supplying intermediate materials to the United States also experienced a decline in profitability. Meanwhile, other studies focused on the problem of climate change into consideration (Chou *et al.*, 2021; Yuan *et al.*, 2023). Using an input-output analysis and a global trade analysis project model to study the impact of the trade war on China's carbon emissions, Chou *et al.* (2021) found that, although Chinese trade values did not change much, its net carbon emissions increased mainly due to the dependence on energy-intensive industries. Similarly, Yuan *et al.* (2023) indicated that the US-China trade war reduced greenhouse gas emissions by 1.2%, but when trade in related products was redistributed among other countries worldwide, it would increase net emissions by up to 1.8%. In addition, Yang *et al.* (2022) examined the impact of the trade war on land supply in China and found a positive effect on the land supply of high-tech industries.

There have also been empirical studies aimed at quantifying the impact of trade wars on Vietnam as a bystander country (Choi and Nguyen, 2023; Mayr-Dorn *et al.*, 2023). For example, utilizing the panel data set between Vietnam and ten main partners from 2007 to 2019, Nguyen (2020) provided evidence that the US-China trade war contributed to an increase in foreign direct investment (FDI) inflows into Vietnam by 0.57%. The trade war also enhances Vietnamese competitive advantages in labor-intensive industries while China loses its competitiveness (Dhar *et al.*, 2023). Choi and Nguyen (2023) used regression analysis and found a negative impact of the trade war on Chinese exports to the United States. In addition, the study also found a positive impact on Vietnam's exports, especially after the third round of US tariffs on Chinese commodities. The study of Ngoc and Dainn (2023) showed that labor in industries affected by tariff increases is more secure than in industries not affected. Likewise, Mayr-Dorn *et al.* (2023) also indicated that workers in industries and regions affected by the trade war have more employment opportunities, resulting in higher wages. Anh and Anh (2023) used firm-level data to study the impact of the trade war on the activities of companies in the context of coronavirus disease 2019 (Covid-19) and saw positive impacts of the trade war on investment, profits and value-added by affected companies. Focusing on the trade balance between Vietnam and China, scholars witnessed a positive effect of the trade war on the export-import ratio of Vietnam and China (Tu *et al.*, 2024).

In addition to empirical studies using quantitative methods, there is much literature investigating the impacts of the trade war on Vietnam, especially on its exports using qualitative and descriptive statistics methods. Among those studies, some scholars argued that Vietnamese exports should significantly benefit from the trade war (Ha and Phuc, 2019; Samuel, 2020) whereas others expressed concerns over the possibility of Vietnam gaining from it (Hoa, 2019; Quan, 2019). Some studies predicted that the impacts of the trade war on exports in Vietnam are positive or negative depending on each specific sector (An, 2018; Lich, 2018).

All in all, there have been a large number of studies attempting to investigate the effects of the trade war globally and on Vietnam, quantitative studies that seek to understand the impact of the trade war on Vietnam's exports to the United States, the largest importing market of Vietnam, as well as the effects of the trade war on different export sectors, are limited. Therefore, the authors attempt to evaluate the effects of the trade war on Vietnam's export activities to the United States, taking into account the heterogeneous effects of the trade war on different export sectors. Empirical evidence from this study should support policymakers and exporting enterprises from Vietnam to formulate their export policies to the United States.

Empirical model and data

Model

The authors employ the DiD model to identify the impact of the US-China trade war on Vietnam's exports to the United States. In causal inference, one among several major

problems is endogeneity caused by omitted variable bias. This happens when unobservable factors are correlated with the variable of interest (in this case, the US-China trade war), resulting in biased estimates (Wilms *et al.*, 2021). For example, changes in the unobservable economic, political and diplomatic policies between the United States and China might be correlated with the two countries' trade relations, causing biased estimates on the impact of the trade war. Given the fact that these unobservable factors influence exports of both the groups of goods and services affected by the trade war (treatment group) and the groups not affected by the trade war (control group). Assuming that the unobservable differences between the two control and treatment groups remain constant over time, i.e. the two groups follow parallel trends (Goodman-Bacon, 2021), the DiD method can help to consider the omitted variable bias and provide more robust estimates (Figure 2).

Specifically, to assess the impact of the trade war, the author compares the export values between two groups, treatment and control group, after and before being affected by the trade war. The treatment group includes goods and services that are subject to the US's additional import tariffs on Chinese products and the control group includes those that are not subjected to increases in import tariffs. The goods and services are categorized based on the 6-digit harmonized system (HS).

Following Angrist and Pischke (2009), the DiD model to estimate the impact of the trade war on Vietnamese exports to the United States is as follows:

$$\ln exp_{it} = \alpha + \beta_{DD} tradewar_{it} + \sum_{k=1}^{N-1} \gamma_k HS_{ki} + \sum_{j=1}^{M-1} \delta_j time_{jt} + e_{it}$$

Where $\ln exp_{it}$ represents the logarithm of the Vietnamese export value of the product i to the US market at the time t . Products i has a corresponding 6-digit HS code. The variable $tradewar_{it}$ is a dummy variable that takes a value of 1 if the product i is a Chinese good or service subjected to additional import tariffs by the US from the effective date, and 0 otherwise. HS_{ki} is a dummy variable taking the value of 1 if it is a product i and 0 otherwise. Assuming there are $N - 1$ products, after excluding one product as a reference, we have total $N - 1$ remaining products, corresponding to $N - 1$ dummy variables. Similarly, $time_{jt}$ is a dummy variable denoting the month t . With M observed months, we have $M - 1$ dummy variables. $\alpha, \beta_{DD}, \gamma_k, \delta_j$ are coefficients to be estimated, and e_{it} is an idiosyncratic error. We are interested in both the magnitude and sign of the β_{DD} coefficient.

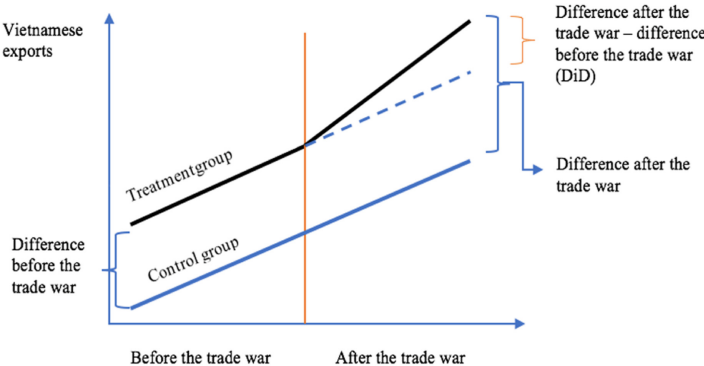


Figure 2.
DiD method

Source(s): Described by the authors

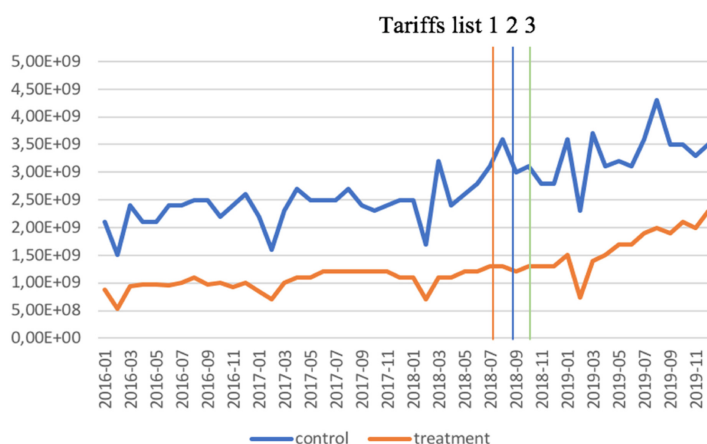
In addition to evaluating the impact of the trade war on total Vietnamese exports, the authors also ran DiD regressions to examine the effects of the trade war on the main sectors that Vietnam exports to the United States. However, it should be noted that we only run DiD estimates on sectors that we can both find treated and controlled groups at the 6-digit HS level. Therefore, some sectors included in the estimations are plastics and articles thereof (HS39), textiles and garments (from HS50 to HS63), machinery and mechanical appliances (HS84), electrical machinery products (HS85), vegetables and fruit (HS07, HS08, HS20), wood (HS44), fish and crustaceans (HS03), furniture (HS94) and iron or steel articles (HS73).

As previously mentioned, the DiD model relied on a crucial assumption that the treated and controlled groups follow parallel trends. Looking at Figure 3, it can be seen that there are similar trends in the export values from Vietnam to the United States of the two groups affected and unaffected by the US-China trade war. In other words, the parallel trends assumption is likely to be satisfied.

Data

Export data are collected from the UN Comtrade database. All goods and services with 6-digit HS codes that Vietnam exports to the United States are included. Products are classified into treated and controlled groups in line with the information published by the US Trade Representative on the lists of Chinese goods subject to increased import tariffs [1].

The data are in monthly basic from January 2018 to August 2019. As stated in the introduction, the United States has officially imposed higher import tariffs on Chinese commodities since July 2018, over a total of four rounds of tariff increases, each with a specific effective date (as shown in Table 1). There are a number of reasons for choosing that research period. First, the authors want to concentrate on the time period right before and after the trade war, which allows an estimate of the pure impacts of the trade war on Vietnamese exports. Second, the research period extends to August 2019, before the fourth round of US tariffs on Chinese goods and services. When the fourth round was added, most goods and services with 6-digit HS codes imported to the United States fell within the lists subject to increased tariffs. As a result, it is challenging to find products on the lists to serve as control groups. The inability to find sufficient control groups makes it difficult to assess the impact of the trade war on Vietnam's exports using the DiD method. Third, the Covid-19 pandemic



Source(s): Described by the authors based on UN Comtrade data

Figure 3.
Vietnamese exports
before and after the
increases in the US'
tariffs on Chinese
imports

began in China at the end of 2019 and quickly spread around the world, affecting the trade performance of all the nations. Hence, including the time period from late 2019 in the study could potentially bias the estimated results.

Empirical results

Table 3 presents the results from DiD regression on the impacts of the US-China trade war on Vietnamese exports to the United States. Overall, the US-China trade war contributed to boosting Vietnam’s exports to the United States. The estimated DiD coefficient for the variable “tradewar” is 0.141 and statistically significant at the 1% level, indicating that the trade war increased Vietnamese exports by approximately 14%.

In addition to estimates of total Vietnamese exports to the United States, we also consider the heterogeneous impacts of the trade war on different export sectors of Vietnam. The results show that some industries were strongly affected by the trade war, such as plastics and articles thereof (HS39), iron or steel articles (HS73), textiles and garments (from HS50 to HS63), and machinery and mechanical appliances (HS84). Specifically, the trade war increased exports of plastic products by over 35%, iron or steel articles by about 31%, textiles and garments by about 24%, and machinery and mechanical appliances by an estimated 19%. Since those products, especially textiles and garments, and machinery and mechanical appliances, constitute a significant proportion of Vietnamese exports to the United States, the significant increase in exports of these products has led to an overall increase in the value of Vietnamese exports to the United States. However, the authors did not find statistically significant effects of the trade war on other export sectors of Vietnam, such as electrical machinery products (HS85), agriculture (HS07, HS08, HS20) forestry (HS44), aquatic products (HS03) and furniture (HS94).

We also conducted a falsification test for the time before the trade war to check the robustness of the empirical evidence on the impact of the trade war. Specifically, the time period chosen spans from January 2017 to June 2018, before the time the United States

Dependent variable	Total exports (all HS)	Machinery and mechanical appliances (HS84)	Electrical machinery (HS85)	Textiles and garments (HS50-HS64)	Fish (HS03)
Tradewar	0.141*** (0.024)	0.189* (0.112)	−0.077 (0.082)	0.241*** (0.063)	0.150 (0.224)
Constant	11.631*** (0.333)	9.224*** (0.287)	8.334*** (0.234)	6.949*** (0.541)	13.087*** (0.300)
Observations	28,154	2,300	2,445	5,827	1,022
R-squared	0.891	0.849	0.899	0.903	0.886

Dependent variable	Plastics (HS39)	Vegetables, fruits, nuts (HS07,08,20)	Wood (HS44)	Furniture (HS94)	Iron or steel articles (HS73)
tradewar	0.356** (0.150)	0.063 (0.243)	0.025 (0.135)	0.013 (0.143)	0.308*** (0.114)
Constant	13.051*** (0.238)	8.552*** (0.659)	9.023*** (0.204)	14.879*** (0.227)	9.799*** (0.564)
Observations	958	1,103	646	753	1,753
R-squared	0.861	0.882	0.923	0.927	0.856

Note(s): Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$
Source(s): Calculations of the authors based on UN Comtrade data

Table 3.
DiD estimates on the impacts of the US-China trade war on Vietnamese exports

officially imposed the first round of tariffs on Chinese commodities in July 2018. The hypothetical start time of the trade war is assumed to be July 2017. The result from the falsification test for the total exports is insignificant (Table 4). In addition, the falsification test results for the other export sectors are mostly insignificant except for negative impacts found in the textile and garments, and iron and steel articles. Therefore, generally, the reliability of our findings could be confirmed.

Discussion and implications

The finding of a positive effect on total exports is in line with predictions of trade diversion theory (Steinbock, 2018), which suggests that the United States and China should reduce trade between each other while they should increase their exports from bystander countries. The result is also consistent with findings from previous studies, such as research of Choi and Nguyen (2023), Fajgelbaum *et al.* (2021) and UNCTAD (2019), which found positive effects of the trade war on third nations, including Vietnam.

Regarding the heterogeneous effects of the trade war, industries such as iron or steel articles, machinery and mechanical appliances, and textile and garments benefit from the trade war, mainly because the prices of Vietnamese goods have become relatively cheaper compared to Chinese goods after China faced an increase in import tariffs from the United States (Euihyun, 2022). These products are primarily in the group for which the United States raised import tariffs on China to as high as 25%, reducing the competitiveness of Chinese goods and increasing the opportunities to gain market share in the United States for Vietnamese goods. Additionally, for certain products, the increase in exports to the US market may also result from Vietnam being able to import cheaper raw materials from China and the United States when those two countries imposed higher tariffs on each other in the trade war. For instance, in the case of plastics, Vietnam could import plastic raw materials for production at lower prices from the United States, one of Vietnam's largest import markets for plastic raw materials (Vinachem, 2019). In addition to this, Chinese investors may also increase investment in Vietnam to avoid

Dependent variable	Total exports (all HS)	Machinery and mechanical appliances (HS84)	Electrical machinery (HS85)	Textiles and garments (HS50- HS64)	Fish (HS03)
tradewar	0.033 (0.025)	0.091 (0.099)	-0.141 (0.090)	-0.137* (0.072)	0.022 (0.221)
Constant	11.934*** (0.471)	8.015*** (0.332)	8.640*** (0.238)	7.052*** (0.568)	8.651*** (0.294)
Observations	25,639	2,084	2,132	5,570	948
R-squared	0.893	0.882	0.903	0.893	0.866
Dependent variable	Plastics (HS39)	Vegetables, fruits, nuts (HS07,08,20)	Wood (HS44)	Furniture (HS94)	Iron or steel articles (HS73)
tradewar	0.071 (0.243)	0.091 (0.125)	0.147 (0.164)	0.079 (0.200)	-0.337*** (0.124)
Constant	13.078*** (0.353)	9.170*** (0.712)	12.679*** (0.262)	6.673*** (0.477)	6.546*** (0.426)
Observations	442	690	827	1,053	995
R-squared	0.832	0.943	0.846	0.902	0.897

Note(s): Standard errors in parentheses, *** $p < 0.01$, * $p < 0.1$

Source(s): Calculations of the authors based on UN Comtrade data

Table 4.
Falsification test

high tariffs imposed by China on plastic products imported from the United States (Vinachem, 2019). Similarly, for machinery and mechanical appliances, Vietnam can import raw materials such as iron, steel and various alloys at lower prices from China to manufacture machinery and equipment for export to the United States (VSI, 2019). It is notable that the groups of commodities benefiting the most from the trade war are intermediate goods, not consumption goods. In the case of the textile and garments sector, the increase in exports mostly comes from the contribution of textile fibers, fabrics and materials with 2-digit HS codes ranging from 50 to 60. The intermediate goods are also the highly targeted groups of the United States in the trade war (Erica, 2018). In addition, there is a possibility that exports of some industries may go up partly because Chinese companies have tried to manage to export their products to the United States via Vietnam (Vietnamnet, 2018).

Conversely, we did not find significant impacts of the trade war on the other consumption goods such as smartphones, wood products, furniture, agriculture, forestry and aquatic products. It may come from the fact that those consumption goods are not targeted by the United States. In addition, agricultural products have long faced many trade barriers imposed by the United States. For example, Vietnamese shrimp and catfish have been involved in several anti-dumping lawsuits by the United States and have high tariffs imposed on them as a result (Huy, 2018). In addition to seafood products, wood and wood products, and furniture, have been also under investigation for trade fraud by the United States. The United States officially initiated a tax evasion investigation against US companies (Statista, 2023) importing plywood from Vietnam since October 2019 (Khue, 2023). Furthermore, the US market often demands high-quality products with high standards of safety and clear origins while many Vietnamese domestic firms have been struggling to meet those standards (MOST, 2017).

The results provide some suggestions for policymakers and exporting firms when exporting their commodities to the United States – one of the most important traders with Vietnam. In order to utilize the opportunities from the US-China trade war to promote sustainable export and economic growth, Vietnam should focus on enhancing competitive capabilities and ensuring the origin tracing and quality of the exporting products. Specifically, exporting firms should carefully consider the use of semi-finished and finished materials from China to minimize the risk of investigation and the application of trade defense measures (WTO, 2019). Vietnam should diversify its portfolio of export goods to the US market by exploiting the positive impacts on some products, though these might not account for a major export share of the country such as plastics. In addition, sound policies to attract quality foreign investment from China when they want to shift their production to Vietnam could play an important role in increasing Vietnamese exports to the United States (Soboleva, 2021). Finally, with the increasing trends in sustainable and green consumption around the world and in the United States, Vietnamese exporting firms should also consider sustainable production practices and aspects such as environmentally-friendly packaging, child labor issues and animal welfare, to enhance their competitive advantage (Statista, 2023).

Conclusion

The US-China trade war has had huge impacts, not only on China and the United States but also on other countries around the globe. As a nation pursuing an export-led growth model, Vietnam is significantly affected by the trade war. The study focuses on quantifying the impact of the US-China trade war on Vietnamese exports to the United States using the DiD approach, while also considering the heterogeneous effects on different export sectors.

The findings revealed that the US-China trade war has led to an approximate 14% rise in Vietnam's total exports to the United States. Certain sectors have experienced significant positive impacts such as textiles and garments, machinery and mechanical appliances,

plastics, and iron or steel products. The increased US tariffs on Chinese imports have likely boosted the competitiveness of Vietnamese products, resulting in a substitution effect of Vietnamese goods for Chinese goods in the US market.

Nevertheless, the authors did not find evidence of the impact of the US-China trade war on Vietnam's exports of agricultural products, machinery and electronic equipment, and furniture to the United States. This is because the consumption commodities are not a targeted group in the US tariff lists. Other reasons may be attributed to the low quality of Vietnamese goods and services, the high level of protective barriers imposed by the United States as well as its concerns about the possibility that Chinese commodities could be potentially transited via Vietnam to enter the United States. Therefore, to enhance Vietnamese exports to the United States in the context of the trade war, Vietnam should maintain its competitive advantage, improve the quality of export products, effectively implement origin tracing and attract good foreign investors to set up their business in the country.

Our study has some limitations. First, as we could only find treatment for certain groups of commodities, the impacts on some export sectors, such as footwear, toys and sports equipment, were not identified. In addition, the reasons behind the positive or negative impact on each export sector were not fully understood. Moreover, we only focused on the period before Covid-19 and the fourth round of the trade war; the situation may have significantly changed due to the pandemic, leading to a cooling down of the trade war. Hence, further research should take into account the new context to comprehensively evaluate the impacts of the trade war.

Note

1. The details are published on website <https://ustr.gov/issue-areas/enforcement/section-301-investigations/tariff-actions>

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