

# DOES THE OUTCOME OF THE US-CHINA TRADE WAR MEET THE PURPOSE?

An Undergraduate Research Scholars Thesis

by

YUHAN ZHANG and XUEZHOU CHONG

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Dr. Qi Li

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## ABSTRACT

Does the Outcome of the US-China Trade War Meet the Purpose?

Yuhan Zhang and Xuezhou Chong  
Department of Economics  
Texas A&M University

Research Advisor: Dr. Qi Li  
Department of Economics  
Texas A&M University

Nowadays, as the two largest economies in the world, China and US economic relations have expanded substantially over the past decades. China is the US's second-largest merchandise trading partner, third-largest export market, and the most significant source of imports. (Li, He & Lin, 2018). During Trump's presidency, he advocated tariffs to reduce the deficit of the US and promote domestic manufacturing. Our interest is to see whether the Trade War reduces the US's trade deficit with China and whether it is indispensable. People might ask, hasn't this topic been studied before? The answer is yes, and no. Our group cogitate and propose a fresh idea, which is the Treatment Effect analysis put forward by Hsiao, Ching, and Wan. This method is our most preferred option since it is considered as one of the 'simplest' and 'accurate' method in the treatment effects estimation literature. We run the related regression and predict the counterfactual trade deficit between the US and China as if the Trade War had not existed. Then we calculate the average difference between the actual value and the predicted ones. Finally, we conclude that instead of reduces, the Trade War increases 1.5 million of the US's trade deficit with China. We hope that this freshly new method with the latest data will give out new cognitions of the Trade War for people interested in this area and inspire future research in this field.

# CHAPTER I

## INTRODUCTION

### **Background**

#### *US and China Have a Great Impact on This World*

Nowadays, for the world economy entities, the United States and China are the top two countries, one with GDP 21.44 trillion USD and the latter one with 14.14 trillion USD (Imf.org, 2020). China, as a country developed in such high speed over the past forty years, is the second-largest importer of manufacturing goods about 1.674 trillion USD in 2019 and the largest exporter of about 2.524 trillion USD in 2019. For international trade as a whole, it would also account for 9.1% of global imports and is responsible for 13.7% of global exports. Meanwhile the U.S. is the world's largest single importer and exporter of goods and services as well as the world's largest exporter and importer of business. It accounts for 14% of global goods imports and 9% of global services imports. Thus issues that broke out between the two countries would undoubtedly influence world trade.

Also, the trading relationship between China and the US has expanded over the past decades. China is the US's second-largest merchandise trading partner, third-largest export market, and the most significant source of imports.

Thus the trade relationship between the two countries is of considerable importance to the world economy and a worthy research topic to investigate.

The reason for the Trump Administration to put tariffs on Chinese goods and start the Trade War is mainly because of political and economic issues. As a Republican president, Trump is in support of people in relatively rural areas, and those are the people who suffer from the import of

Chinese goods most. (Lai, E., 2019) Thus it is politically reasonable to put tariffs on Chinese goods. The other reason is for economic purpose, and that is the purpose of reducing the bilateral trade deficit, which we will discuss particularly below.

*Trade Deficit*

For this paper, we focus on the latter reason mentioned above, and we will discuss whether the US trade deficit with China is reduced and whether the US trade deficit with other countries such as Vietnam, Cambodia, and Malaysia increases.

The trade deficit is the amount by which the value of a country's imports exceeds the value of its exports. As Figure 1 shows, the green columns are the US exports to China, and the blue columns are the US imports from China. The big gaps between the two columns are the U.S. trade deficit with China each year. Statistically, based on the data retrieved from the US census bureau, in 2016, the US trade deficit with China was -346,825.2 million dollars. In 2017, it was -375,422.6 million dollars. While in 2018, -375,422.6 million, and -345,616.7 million in 2019 (M. Ayhan Kose, 2017). The Trade War starts because of the “unfair trade,” according to the Trump administration. The main purpose is to close up the trade deficit gap between the two countries.

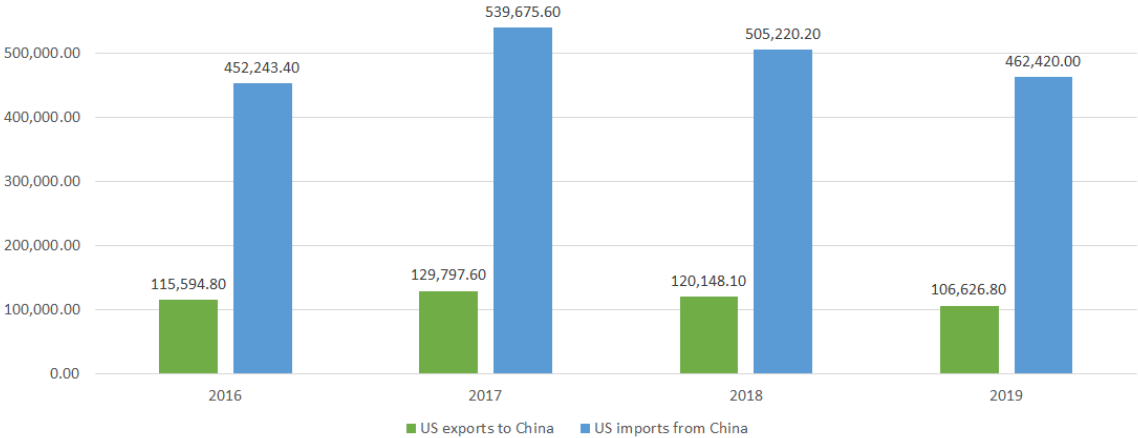


Figure 1. The trade deficit, Data Resource: United States Census Bureau. 2016-2019. Export and Import Total Value by Countries (\$US). Retrieved from: <https://www.census.gov/foreign-trade/balance/c5700.html#2016>.

## Timeline

Figure 2 shows the timeline of the Trade War between the US and China. There are 3 phases until September 1<sup>st</sup>, 2019. The Trade War broke out when the US President Donald Trump announced a 25% tariff on unstipulated imports from China worth USD 150 Billion in April 2018 wishing to reduce the US-China trade deficit by USD 100 Billion. And then, from July 2018 to September 2019, four rounds of tariff have been added on to different amounts of Chinese goods. (Trump's Trade War Timeline: An Up-to-Date Guide, 2019) Then finally, on January 15, 2020, the US and China reached the first phase agreement that was a benefit for both of the countries.

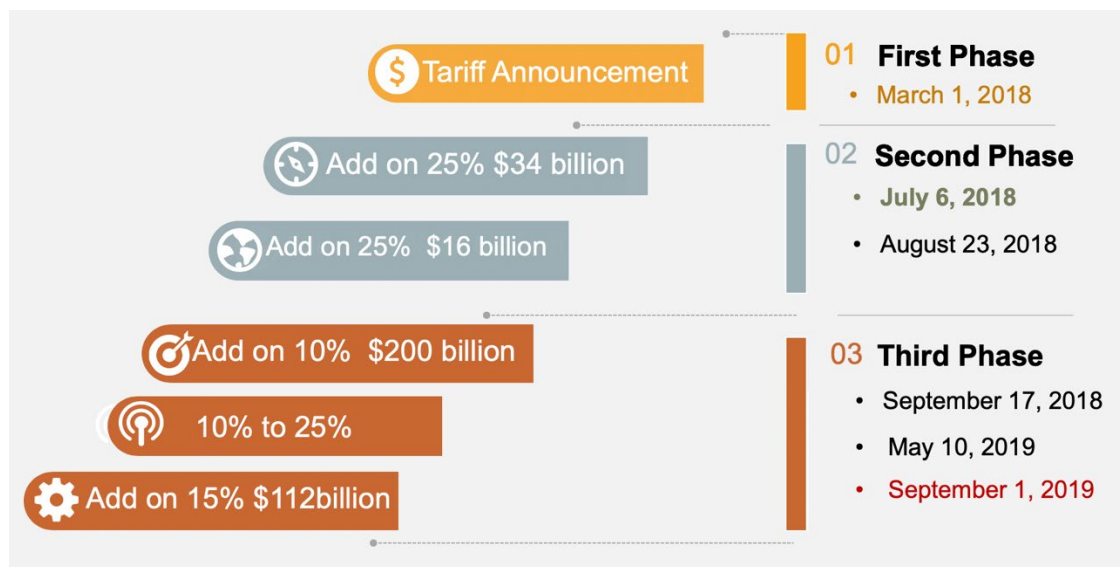


Figure 2. Timeline of the Trade War.

## Literature Review

From the United States perspective, most of the Americans believed that Donald Trump does not face much domestic opposition to this Trade War. Since this is part of a broader strategy taken by Americans to suppress China's rise, in which case China is willing to compromise up to a point. The author of 'The US-China Trade War, the American public opinions, and its effects on China' also predicted that the Trade War would last for a long time. And at the very end, the final

assembly stage of many industries might leave China. Moreover, Hong Kong can be a victim of the Trade War if it escalates. (Lai, E., 2019)

Some discussions on the purpose of starting the Trade War vary. Apart from the reasons stated above, it is also believed that the Trade War has other purposes. Because if it is only to reduce the trade deficit, Trump can solve this problem by merely increasing US exports. Perhaps the two reasons for launching the Trade War are actually that the Chinese restrictions on foreign investment, the supposed theft of intellectual property by the Chinese firm. It gives the conclusion that the business environment would be more challenging for the producers of agricultural, automobiles, aircraft, and chemical products if China imposes retaliative tariffs. At least in the nearest future, the US economy will not be much affected due to the small portion of its value-added exports to China. Nevertheless, there could be other knock-on effects, difficult to quantify in numbers that could raise the pain for US exporters. Moreover, the author put forward a summary that a full-blown Trade War between the US and China will not benefit any party, but both parties might risk losing substantially (Hosain and Hossain, 2019). These reasons for having the Trade War are pretty much reasonable and varies from different perspective, but one thing for sure is that trade war will have negative impact on international trade, output and social welfare. It is predicted that Trade War triggered by high U.S. import tariffs will lead to a collapse in the US-China bilateral trade, the US will experience large social welfare losses, whereas China may lose or gains lightly depending on the effect of Trade War on the the US-China trade balance. And for the world as a whole, some small open economies may experience small benefits, while other countries may suffer collateral damage (Guo, Lu, Sheng, Yu, 2018).

## CHAPTER II

### METHODS AND DATA

#### **Methods Overview**

The goal that we focus on is to see whether the Trade War has an impact on decreasing the trade deficit, so in other words, we need to find out the difference between the actual trade deficit and the trade deficit, assuming that the Trade War had not existed. The latter one is predictable using some statistical methods. However, the accuracy of the predicted data is crucial under this circumstance. So the prioritized method that we used is the treatment effect. More specifically, the traditional DID method is considered as well as the HCW Method, which is brought up by Hsiao, Ching, and Wan in 2012.

#### **Data**

For both of the above mentioned methods, we need our examined group and the control group. The examined group, no doubt, would be the US trade deficit with China before and after the Trade War has broken out, which is through January 2016 to December 2019, the data from the examined group would also be the responsive variable. Then for the control group, the data for this group needs to be not only unaffected by the Trade War, but it also needs to be correlated with US trade deficit with China (the Y variable). To check the correlation using the R statistical analysis software, the R-square should not be too small.

We need to identify control group countries whose trades are not affected by the US-China Trade War. We examined some of the data related to trading from different countries across the world. Finally, we got the one that is suitable for our analysis, which is Turkey export to Germany during January 2016 and December 2019. We can see from Figure 3 below that the volatility of



the volume is not high but rather pretty smooth; the volume before and after July 2018 is at a constant level comparing with 2016. Thus we can assume that Turkey's export to Germany is not affected by the Trade War between the US and China.

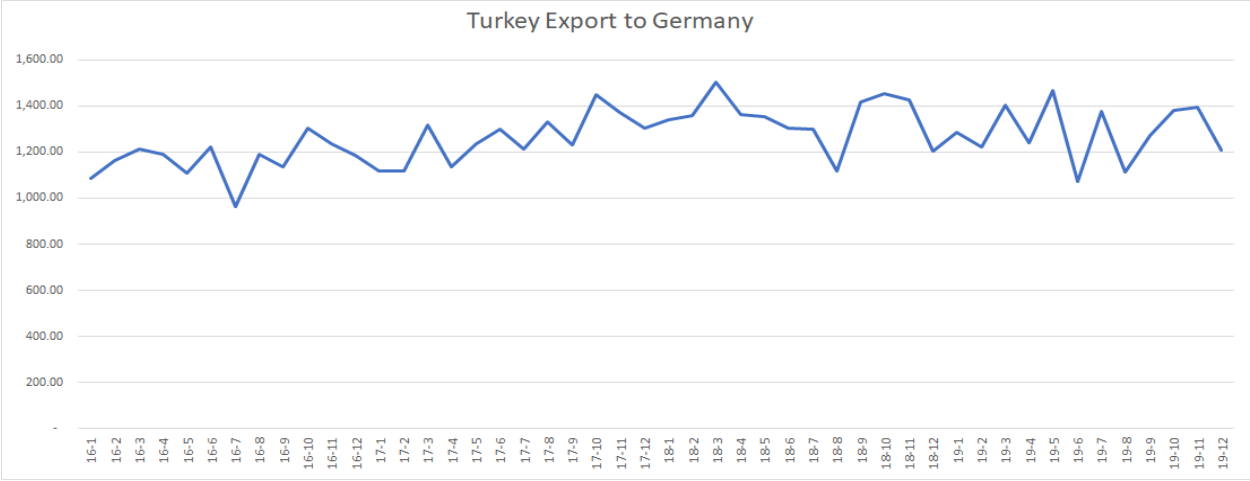


Figure 3. Turkey Export to Germany 2016-2019. Data Source: US Census Bureau.

**Methods**

The first method that we consider is the DID method, which indicates the difference in the outcome before and after the treatment, so for our topic, would be the average difference of difference between the trade deficit and Turkey exports to Germany pre and post the treatment, which is the broke out of the Trade War. However, one thing that needs our attention is that one of the assumptions and conditions of the DID model is that for the pre-treatment period, the two lines need to be parallel with each other, which is not proper for our research for the following reason. The thing is that the US trade deficit follows a quite volatile trend, while at the same time, the control group is pretty stationary. Thus using DID methods will lead to a biased estimation, so we consider using the second method, which is the HCW method proposed by Hsiao, Ching & Wan in 2012.

For the Hsiao, Ching & Wan's method, during the pre-treatment period, the two groups do not have to be parallel with each other, and thus we can predict the value of the trade deficit as if there were no Trade War between China and the United States. We denote our variable as Equation (1) shows

$$y_t = \text{US trade deficit with China}, x_t = \text{Turkey's export to Germany} \quad (1)$$

The Regression model is given in Equation (2). Timepoint T denotes the time when the Trade War broke out, so it is July 2018, and the period before time T would be the pre-treatment period. By estimating the regression model (2), we can obtain the correlation relationship between the dependent and the explanatory variables using the pre-treatment data ( $\widehat{\beta}_{t1}$ ), in other words, it would be the *supposed* correlation between the two groups in the absence of Trade War.

$$y_t = x_t' \beta + \mu_t = 1, \dots, T, \quad \widehat{\beta}_{t1} = (x'x)^{-1}x'Y \quad (2)$$

Next, we estimate the counterfactual outcome by Equation (3). Timepoint  $T_1$  denotes the current time of the research, and that is December 2019. The period between T+1 and  $T_1$  is our post-treatment period, and by using the formula denoted in Equation (3), using the data of the control group and multiply it by the *supposed* correlation  $\widehat{\beta}_{t1}$ , we get the counterfactual US trade deficit with China in the absence of Trade War.

$$\widehat{y}_t = x_t' \widehat{\beta}_{t1}, t=T+1, \dots, T_1 \quad (3)$$

The treatment effect at time t is estimated by  $y_t - \widehat{y}_t$ , and the average treatment effect is estimated by Equation (4). The result is shown in the next chapter.

$$\hat{A} = \frac{1}{T'} \sum_{t=T_1}^T (y_t - \widehat{y}_t), \text{ where } T' = T - T_1 \quad (4)$$

## CHAPTER III

### RESULTS

First, in Figure 4, the solid line is the actual trade deficit; at the same time, the dotted line is the trade deficit without the Trade War. The X-axis is the number of months after the broke out time of the Trade War, and the Y-axis is the actual volume of each group. We can see that for the time before December 2018, the actual trade deficit actually exceeds the predicted ones, and that means the Trade War cause the trade deficit to go up. However, for the tie after that, the two lines come closer, and sometimes the actual trade deficit goes down.

The numerical estimation result is that the average treatment effect is positive 1.5 million per month, which means that overall, instead of decreasing the trade deficit, the Trade War has made the trade deficit go up by 1.5 million per month.

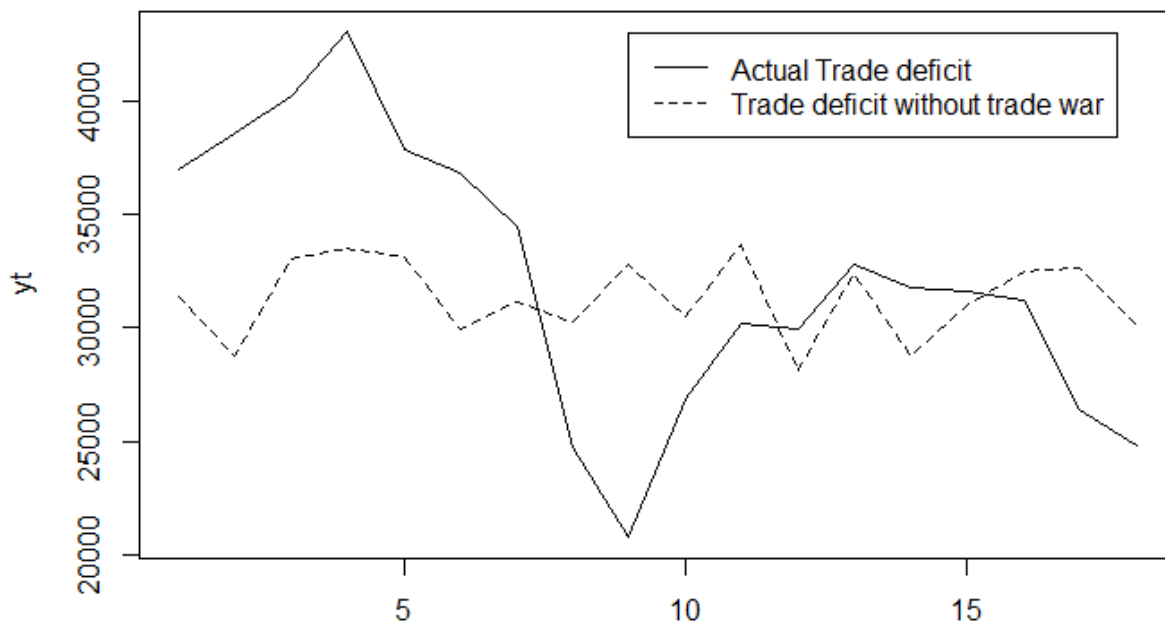


Figure 4. Result 1.

We found that the main reason for the trade deficit to be positive is that between the first six months, the actual trade deficit exceeds the predicted ones. The reason underlying it is that during this time, the United States still needs to import Chinese goods because it needs some time to adjust to the new policy. They may need this time to build new factories or to move the manufacturing facilities out of China, so during that time, the United States still needs to import Chinese goods and thus made the trade deficit very large. However, after that, as is shown in Figure 5, the difference between the two is negative. The negativity means that the actual trade deficit is below the predicted trade deficit, which shows that the Trade War has made the trade deficit decreasing. The average treatment effect for that period is -2.8 million per month.

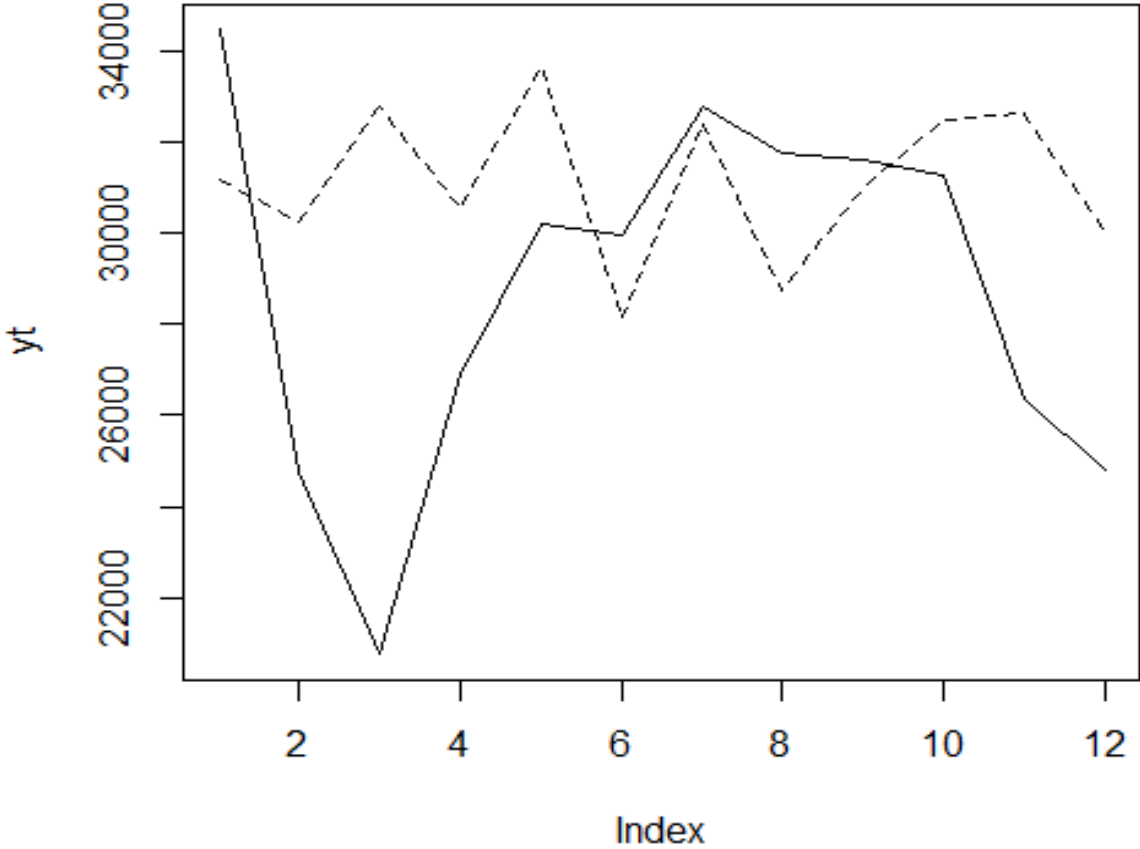


Figure 5. Result 2.

In order to get a more thorough result, we also look at the US trade deficit with Vietnam, Cambodia and Malaysia, the result show in Figures 6, 7 and 8 (all measure in millions of USD).

We can see that although there is no obvious change in Malaysia, there are significant increase in US trade deficit with Vietnam as well as Cambodia, both after July, 2019. So we may conclude that instead of imports from China, the US change their origins more to countries like Vietnam Cambodia, and increase the trade deficit in both of these two countries.

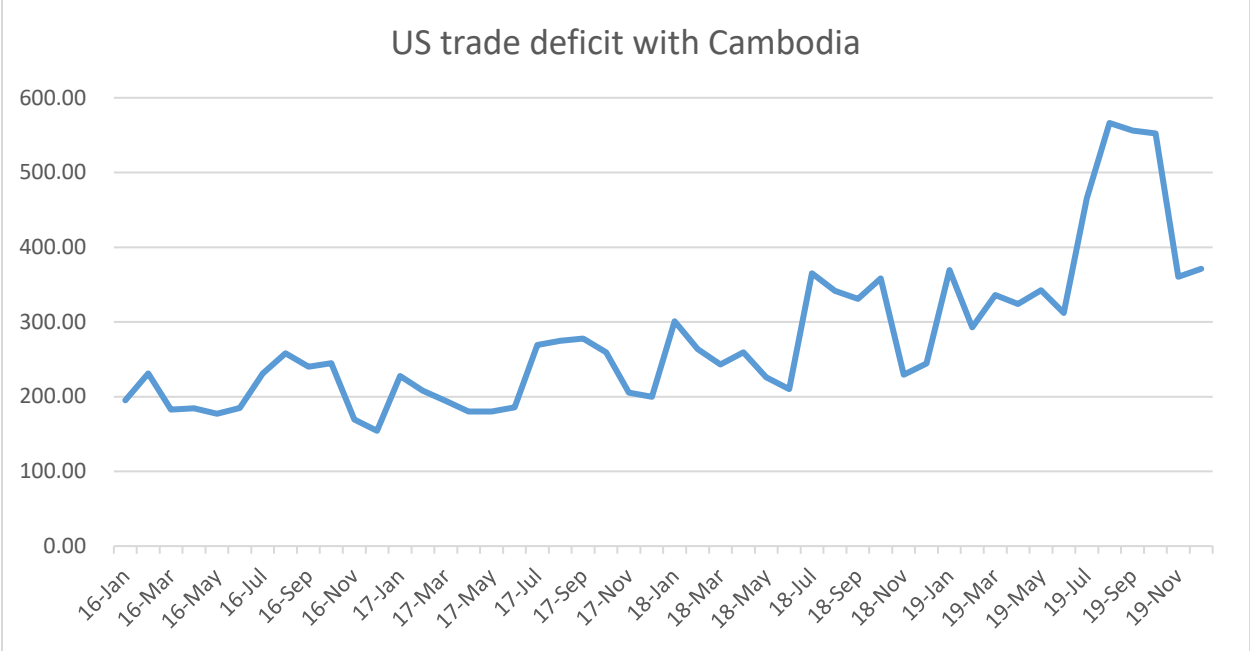


Figure 6. US Trade Deficit with Cambodia 2016-2019. Data Source: US Census Bureau.

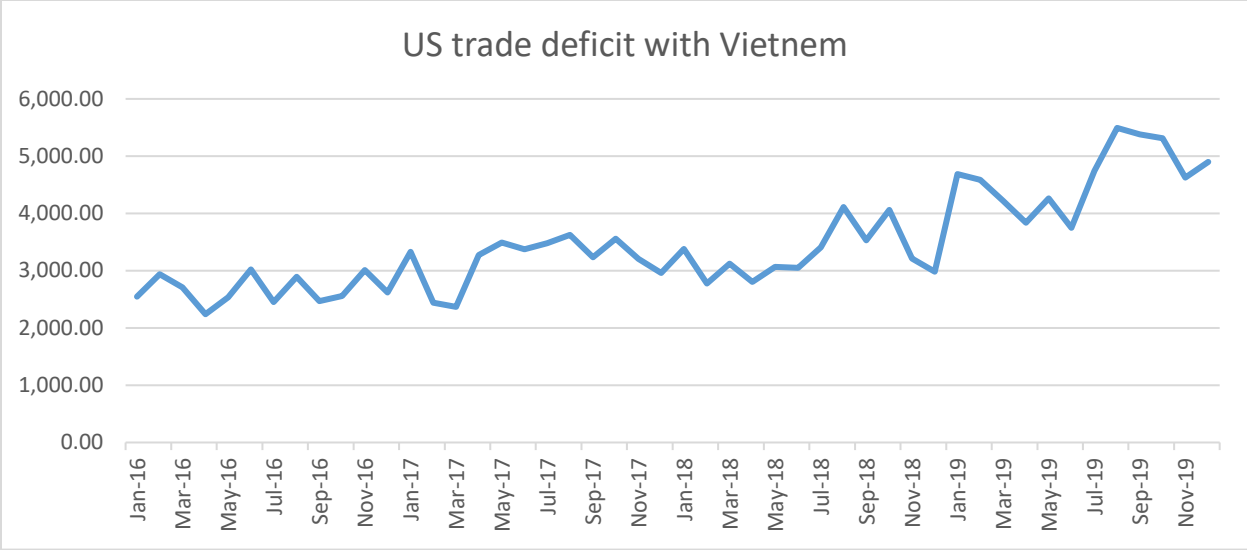


Figure 7. US Trade Deficit with Vietnam 2016-2019. Data Source: US Census Bureau.

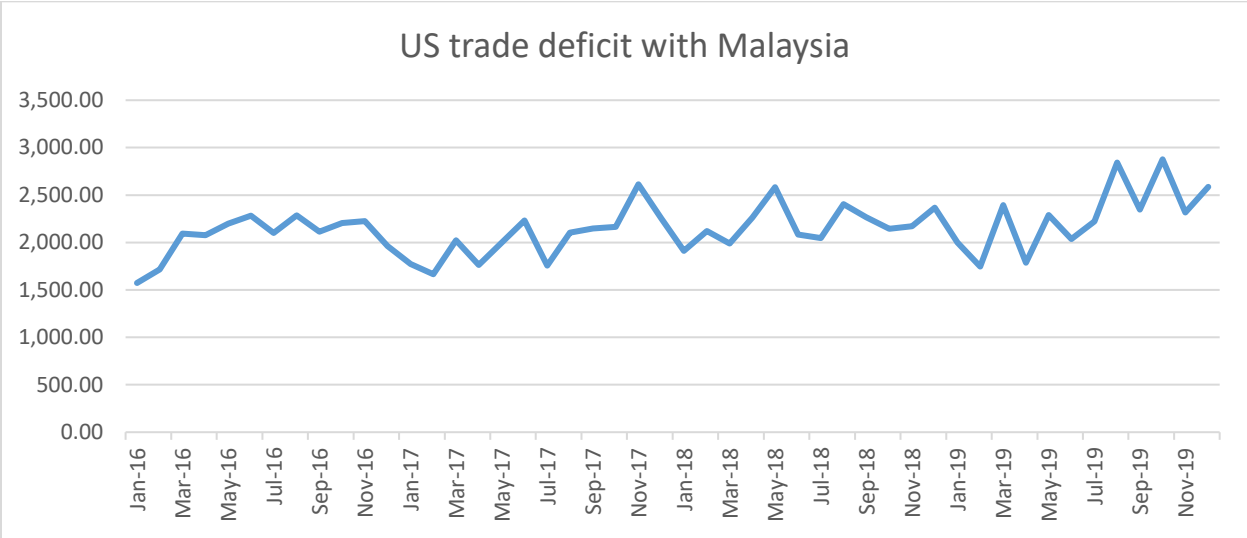


Figure 8. US Trade Deficit with Malaysia 2016-2019. Data Source: US Census Bureau.

## CHAPTER IV

### CONCLUSION

To conclude, we believe in the long run that the Trade War would decrease the US trade deficit with China by using the prediction method by Hsiao, Ching and Wan. However, this may not solved the US trade deficit problem because, in decreasing the trade deficit with China, the United States actually increases the trade deficit with other countries. And thus from an economic perspective, the Trade War is not necessary beneficialry to US although the trade deficit between US and China is expected to decrease in the future should the US-China Trade War continues.

The data that we use was before China-US reached the first phase agreement, and the Trade War continues. In the paper, we use Hsiao, Ching & Wan's method to analyze this Trade War effect numerically. This method does not require the DID parallel lines to hold. By using the least squares method to choose control group's weights flexibly, this method gives reliable estimation result. Therefore, in the long run, as the Trade War continues, we can continue use this method to measure the effects of the Trade War on US-China trade deficit. And we hope that later, researchers can use the latest data to verify our findings.

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