# US-China Trade Conflict, Capital Flows, and the Dynamics of the US Stock

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**Abstract.** With the announcement of the list of tariffed goods on April 4, 2018, the US government announced that it would impose 25% tariffs on 1,330 items imported from China to the US, with a total value of $50 billion, and the trade war which has the largest size in history began, with five moves to impose tariffs on each other before and after the period. This paper focuses on the changes in four key indicators of NASDAQ, S&P 500 Dow Jones Industrial Index, and USD-RMB exchange rate in the past three years from six months before the US-China trade war to January 24, 2020, and studies the capital flow and the impact on the US stock market brought by the US-China trade war through modeling and analysis of the smoothness test, impulse response, VAR model and ARMA-GARCHX model of the data. The research found that the fluctuation of the US stock market is not directly caused by the tariff hike, and the main reason for its fluctuation is the movement of the exchange rate.

**Keywords:** China, US, Trade war, Stock market, ARMA-GARCHX model, VAR model.

## 1. Introduction

In recent years, the United States has had a huge trade deficit with China, and just in the last few years, this deficit has been growing. The then President of the United States, Donald Trump, was extremely dissatisfied with the existence of a huge trade deficit between China and the United States, and such a serious trade imbalance between China and the United States was the trigger for Trump to start a trade war. So, on March 22, 2018, Trump officially kicked off the US-China trade war after signing a memorandum that cited China's theft of US trade secrets and asked the US Trade Representative to impose tariffs on a total of about $60 billion of goods imported from China under Section 301 of the Trade Act of 1974. During this period, the two countries add tariffs on each other for several rounds, covering areas such as agriculture, medical care, electro mechanics, etc. Such mutual adding tariff levies also brought an impact that cannot be ignored on the economies of both two countries.

The US stock market has also shown considerable fluctuation in the face of such trade conflicts. The main reason is that the list of tariff increases on Chinese goods includes many areas where China has an advantage and there are no alternative options for the US, and China is also the main source of imports of these goods from the United States. Therefore, after the implementation of the tariff increase measures, although in the short term it can contribute to the appreciation of the US dollar, the US stock market share prices, and yields, while in the face of China's rapid countermeasures, US companies are anxious to seek alternative solutions but due to the complexity of the technology it is difficult to find alternative methods, which also led to the setback of the US stock market. The most obvious manifestation of this is the reduction of the NASDAQ, S&P 500, and Dow Jones indices, which are the three major indices of US stocks.

The remainder of this paper is devoted to discussing what kind of capital flows would be brought about by mutually adding tariff levies between the US and China, and to analyzing the possible causes of these fluctuations in the US stock market through the construction of a model. The next part is the literature review of this paper, which includes the relevant studies on the sources of trade conflicts between the US and China and the impact of trade conflicts on the US economy and stock market. In part 3, an overview of the data sources used in this paper and the rationale of the model used and set up in this paper are presented. In part 4, this paper estimates two ARMA-GARCH models with the

exchange rate and the point in time of mutual tariffs as the external explanatory variables and finally obtains the results of the empirical analysis which will be discussed in part 5.

## 2. Literature Review

### 2.1. Studies about China-US trade war

In recent times, after the implementation of the reform and opening-up policy, China's economy has been developing rapidly, and Larisa Kapustina et al. show that along with decades of growth, China's share of the economic market has grown, while the United States share of global production and international trade has declined, and the world's political and economic landscape has changed. The United States and China have formed a "binary bloc" [1], and the BBC has described the US-China trade war as a fierce trade war between the world's two largest economies [2]. Growing China has also put the United States under unprecedented pressure, and the growing trade gap between the two countries has created the final trade war situation, which, according to Terence Tai Leung Chong and Xiaoyang Li, is found to be a large part of the trade surplus with the United States after having a detailed study at China's net exports [3]. Wang Yong's analysis of the US-China negotiation list suggests that the US goal is to open China's markets and curb its capital development and technological progress as a way to delay China's rise and challenge the US position of world hegemony [4]. This also confirms Larisa Kapustina et al.'s view that the US has abandoned the idea and concept of free trade in order to maintain its position as a global leader. The trade war in such a situation has seen both sides engage in multiple rounds of mutual tariff increases, which has also had a strong impact on the trade between the two sides [5]. Such effects are also reflected in the changes in exchange rates and the fluctuations in the stock market.

### 2.2. Studies related to the impact of US-China trade war on the US economy and stock market

The most direct manifestation of both sides of the trade war between the United States and China is the tariff increases that both sides have imposed on each other. And the most direct manifestation of this behavior is the change in the volume of trade, Ken ITAKURA in his study in 2020 stated that the trade war between the United States and China reduced imports to the United States and China in almost all sectors. The imports of metals, machinery, and electrical equipment from the United States have decreased significantly [6]. Another manifestation is the movement of the stock market after the tariff hike, Pablo Fajgelbaum Amit Khandelwal in his study focused on the movement of the stock market during the tariff hike and gave the following elaboration of the results, As the trade war unfolded and news of tariff hikes were released. This news coincided with the sharp and typically negative fluctuation in the stock market [7]. Similar findings were reported by Peter Egger and Jiaqing Zhu in 2019 as they also observed a negative cumulative reaction of the US stock market to their own companies [8]. In the BBC report, the US stock market fell for two days after Trump imposed new tariffs on another $300 billion of Chinese imports. And following sharp declines in Europe and Asia, all three major US indices closed the week lower [9]. The negative reaction is also reflected in the US economy, with Heather Long reporting in the Washington post that the US economy is slowing after Trump's tariffs on China, business investment is frozen, and companies are not hiring as many employees. And nationwide, many farmers are unemployed and manufacturing and shipping are at their lowest levels in recent years [10], which is a good indication of the magnitude of the impact of the trade conflict. Stuart Anderson made an explanation for this situation When Donald Trump made his measure to raise tariffs, the reason the stock market generally fell was because tariffs are not good for business. The tariff increase brought trouble to a large portion of investors [11] Also more closely related to tariff increases in trade wars are changes in exchange rates, as participants in trade wars tend to offset the negative effects of tariff increases on commodities with depreciating exchange rates. In a report by CNBC Markets Editor Patti Domm, hours after Trump accused China and Europe of manipulating their currencies and keeping them low against the dollar, The People's Bank of China

set the reference rate for the US dollar at 6.7671 yuan, resulting in the largest two-year decline of 0.9% [12] After this Trump also expressed his concerns.

### 2.3. Review of the literature

While the reasons for the start of the US-China trade war, changes in exchange rates affected by tariffs, and the impact of tariff increases on the economy have been well researched, not much research has been done on the impact of exchange rates and tariffs on the stock market. This paper focuses on the analysis of the impact of exchange rates and tariffs on the US stock market to find out who has a more direct impact and to fill in some of the gaps in the current research field.

## 3. Research design

### 3.1. Data Source

This paper uses investing.com, a financial platform and news website, to search the closing prices of four important indices, the NASDAQ, the S&P 500, the Dow Jones Industrial Average, and the US dollar to the RMB exchange rate, between six months before the US-China trade war and January 24, 2020, and the time points when the US and China imposed tariffs on each other in the trade war as the data basis for the study to examine Capital flows resulting from the trade conflict and the impact on the US stock market.

### 3.2. ADF test

After collecting and organizing the data, the first step is to perform a unit root test on the organized data, the purpose of which is to check the smoothness of the data for subsequent testing and analysis. After putting the integrated data into STATA, it is found that the p-values of the log-returns of the four indicators are all equal to 0 (high significance level), so the original hypothesis can be rejected. Also, this would indicate that the log-return models of these four data are stable (please see Table 1).

**Table 1.** ADF test.

| Variables | t-statistic | p-value |
|---|---|---|
| | Price | |
| Nasdaq | -2.694 | 0.2385 |
| S&P 500 | -2.701 | 0.2358 |
| DJI | -2.885 | 0.1674 |
| USD-RMB | -1.595 | 0.7944 |
| | Yield | |
| Nasdaq | -21.538 | 0.0000*** |
| S&P 500 | -20.671 | 0.0000*** |
| DJI | -20.497 | 0.0000*** |
| USD-RMB | -17.773 | 0.0000*** |

### 3.3. VAR Model

After testing the data for smoothness and obtaining the result that the log returns of all four indicators are smooth, the dynamic relationship of the joint endogenous variables can be estimated for the data by using the VAR model.

$$y_t = c + A_1 y_{t-1} + A_2 y_{t-2} + \cdots + A_P y_{t-P} + e_t \quad (1)$$

Equation (1) is a pth-order VAR, which is generally written as VAR (p). In the equation, c represents the constant term, k*k matrix $A_i$ is time-invariant, $y_{t-i}$ represents the value i periods earlier and $e_t$ is the error term. The establishment of the VAR model requires determining the number of variables that have interaction, i.e., p in the equation above. The interacting variables in this paper are the log returns of the four indicators. Another important value is the number of lagged

variables (k) needed to explain clearly the endogenous variables that have interactions. k is determined in three ways.

The first method is the LR likelihood method, which indicates that the lag order of the VAR model is appropriate when the LR statistic is less than a critical value.

$$LR = -2(log\ L_k - log\ L_{k-1}) \tag{2}$$

When the LR statistic is greater than the critical value, it indicates that the lag order of the VAR model is not high enough, and thus more lagged variables need to continue to be added as explanatory variables. However, when the sample size is much smaller than the number of parameters being estimated, the finite sample distribution of LR will not be consistent with the asymptotic distribution of LR. The second approach is through the AIC statistic,

$$AIC = log\left[\frac{\sum_{t=1}^{T} e_t^2}{T}\right] + \frac{2k}{T} \tag{3}$$

$$\min_k\{AIC\} = log\left[\frac{\sum_{t=1}^{T} e_{kt}^2}{\sum_{t=1}^{T} e_{(k+1)t}^2}\right] - \frac{2}{T} \tag{4}$$

Where two VAR models with lag orders k and k+1, respectively, indicate a more moderate lag order as long as their AIC statistics are closer. The third method is by using SC statistics below

$$SC = log\left[\frac{\sum_{t=1}^{T} e_t^2}{T}\right] + \frac{k\ log\ T}{T} \tag{5}$$

$$\min_k\{sc\} = log\left[\frac{\sum_{t=1}^{T} e_{kt}^2}{\sum_{t=1}^{T} e_{(k+1)t}^2}\right] - \frac{log\ T}{T} \tag{6}$$

Which is similar to the AIC statistic, for two VAR models with lag orders k and k+1, respectively, as long as their SC statistics are closer, it indicates a more moderate lag order. After the var model is established, three impulse plots can be constructed with the log-return of the exchange rate as the impulse variable and the other three parameters as the response variables, and the impact of exchange rate changes on the stock market can be studied through these plots.

### 3.4. ARMA-GARCHX model

#### 3.4.1 ARMA (p, q) model

$$x_t = \phi_0 + \sum_{i=1}^{p} \phi_i x_{t-i} + a_t - \sum_{i=1}^{q} \theta_i a_{t-i} \tag{7}$$

ARMA (p, q) model consists of AR (p) model and MA (q) model. AR (p) model is a model which can use the past realized value to make predictions while the MA (q) model uses the past fluctuation to predict the future. ARMA (p, q) model combines these two models and predicts the future with both past realizations and past perturbations. Especially in this paper, the AR (p) model uses the data of the log-return of NASDAQ, S&P 500, and Dow Jones for the chosen period (6 months before the trade war to 2020.1.24).

#### 3.4.2 GARCH (p, q) model

After identifying the ARMA model, this paper constructs ARMA-GARCH models for the NASDAQ, S&P 500, and Dow Jones indicators, respectively. In estimating the models, log exchange rate returns are first introduced into the models as external explanatory variables for estimation. Then the point in time when the US imposed tariffs on China was added to the model as a dummy variable

to obtain the second set of estimates. Thus, this paper can estimate the correlation between the US-China trade conflict and the fluctuation of the US stock market and compare the impact of trade conflict and exchange rate changes on the US stock market.

The general form of the ARMA-GARCH model is as follows:

$$\sigma_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \cdots + \alpha_q \varepsilon_{t-q}^2 + \gamma_1 \sigma_{t-1}^2 + \cdots + \gamma_p \sigma_{t-p}^2 \quad (8)$$

Equation (8) above consists of two parts, the first part $\alpha_1 \varepsilon_{t-1}^2 + \cdots + \alpha_q \varepsilon_{t-q}^2$ are ARCH model and the second part $\gamma_1 \sigma_{t-1}^2 + \cdots + \gamma_p \sigma_{t-p}^2$ is the GARCH model, $\sigma_t^2$ is the conditional variance of the term $\varepsilon_t$ and the subscript t represents the period. All the external explanatory variables should be added to the equation above.

The GARCH model is a model based on the ARCH model and extended, it reduces the number of parameters to be estimated, thus allowing for more accurate predictions of future conditional variance [13]. Because of the principle of the GARCH model, simplify the ARCH (p, q) model to GARCH (1, 1) model by iteration.

$$a_t = \sigma_t \varepsilon_t \cdot \varepsilon_t \ \ is \ \ i.i.d. \quad (9)$$

$$\sigma_t^2 = \alpha_0 + \alpha_1 a_{t-1}^2 + \beta_1 \sigma_{t-1}^2 + \beta * Exchange \ \ Rate_t$$
$$\sigma_t^2 = \alpha_0 + \alpha_1 a_{t-1}^2 + \beta_1 \sigma_{t-1}^2 + \gamma_1 D_1 + \gamma_2 D_2 + \gamma_3 D_3 + \gamma_4 D_4 + \gamma_5 D_5 \quad (10)$$

Equation 9, 10 above is the GARCH (1, 1) model with the exchange rate and Dummy variables expressed by the point in time of tariff increase as the external explanatory variables

## 4. Empirical Results and Analysis

### 4.1. Order of VAR model

**Table 2.** VAR model identification.

| Lag | LL | LR | df | p | FPE | AIC | HQIC | SBIC |
|---|---|---|---|---|---|---|---|---|
| 0 | 12143.8 | | | | 2.2e-20* | -33.9099* | -33.9001* | -33.8844* |
| 1 | 12157 | 26.546 | 16 | 0.047 | 2.2e-20 | -33.9023 | -33.853 | -33.7745 |
| 2 | 12169.5 | 24.878 | 16 | 0.072 | 2.2e-20 | -33.8924 | -33.8036 | -33.6624 |
| 3 | 12179.3 | 19.589 | 16 | 0.239 | 2.3e-20 | -33.875 | -33.7468 | -33.5429 |
| 4 | 12182.9 | 7.2821 | 16 | 0.967 | 2.4e-20 | -33.8405 | -33.6728 | -33.4061 |
| 5 | 12191.4 | 17.055 | 16 | 0.382 | 2.4e-20 | -33.8196 | -33.6124 | -33.2831 |
| 6 | 12199.2 | 15.615 | 16 | 0.480 | 2.5e-20 | -33.7967 | -33.5501 | -33.158 |
| 7 | 12209.9 | 21.317 | 16 | 0.167 | 2.5e-20 | -33.7818 | -33.4957 | -33.0408 |
| 8 | 12221.1 | 22.367 | 16 | 0.132 | 2.5e-20 | -33.7684 | -33.4428 | -32.9252 |
| 9 | 12228.4 | 14.709 | 16 | 0.546 | 2.6e-20 | -33.7442 | -33.3792 | -32.7988 |
| 10 | 12234.6 | 12.254 | 16 | 0.726 | 2.7e-20 | -33.7166 | -33.3121 | -32.669 |
| 11 | 12243.7 | 18.241 | 16 | 0.310 | 2.7e-20 | -33.6974 | -33.2534 | -32.5476 |
| 12 | 12247.3 | 7.1969 | 16 | 0.969 | 2.8e-20 | -33.6628 | -33.1793 | -32.4108 |
| 13 | 12259.6 | 24.641 | 16 | 0.076 | 2.9e-20 | -33.6525 | -33.1296 | -32.2983 |
| 14 | 12269.2 | 19.127 | 16 | 0.262 | 2.9e-20 | -33.6345 | -33.0721 | -32.1781 |
| 15 | 12274.9 | 11.481 | 16 | 0.779 | 3.0e-20 | -33.6059 | -33.004 | -32.0472 |
| 16 | 12289.7 | 29.56 | 16 | 0.020 | 3.0e-20 | -33.6025 | -32.9611 | -31.9416 |
| 17 | 12296.9 | 14.411 | 16 | 0.568 | 3.1e-20 | -33.5779 | -32.8971 | -31.8149 |
| 18 | 12304.1 | 14.502 | 16 | 0.561 | 3.2e-20 | -33.5535 | -32.8332 | -31.6882 |
| 19 | 12313 | 17.754 | 16 | 0.339 | 3.2e-20 | -33.5336 | -32.7738 | -31.5661 |
| 20 | 12323.6 | 21.245 | 16 | 0.169 | 3.3e-20 | -33.5185 | -32.7193 | -31.4489 |
| 21 | 12336 | 24.756 | 16 | 0.074 | 3.3e-20 | -33.5084 | -32.6697 | -31.3366 |
| 22 | 12352.5 | 33.052 | 16 | 0.007 | 3.3e-20 | -33.5099 | -32.6318 | -31.2358 |
| 23 | 12366.9 | 28.713 | 16 | 0.026 | 3.3e-20 | -33.5053 | -32.5877 | -31.129 |
| 24 | 12380.9 | 27.992* | 16 | 0.032 | 3.3e-20 | -33.4997 | -32.5426 | -31.0212 |

From Table 2 this paper chooses 24 as the maximum order and from the table this paper chooses 22 as the order to do the unit circle test because the 22 order's p-value is the smallest so its result is most significant. And the result is shown in figure below

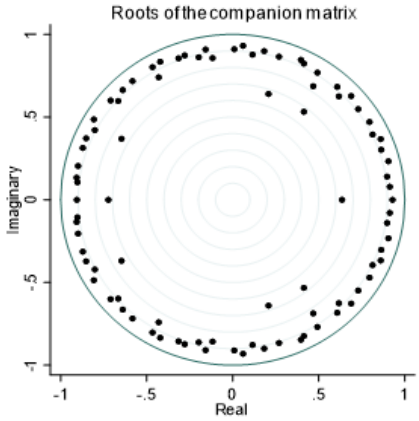


**Figure 1.** Unit circle test.

The results in Figure 1 tell us that the VAR model is smooth at order 22 because all points fall inside the unit circle as seen in the figure. A sufficient condition for the VAR model to be stable is that the eigenvalues of the coefficient matrix fall inside the unit circle.

### 4.2. Impulse Response

After the smoothness of the VAR model is determined. Three impulse plots are made using the log-return of the NASDAQ, S&P 500, and Dow Jones indices as response variables and the log-return of the exchange rate as impulse variables.

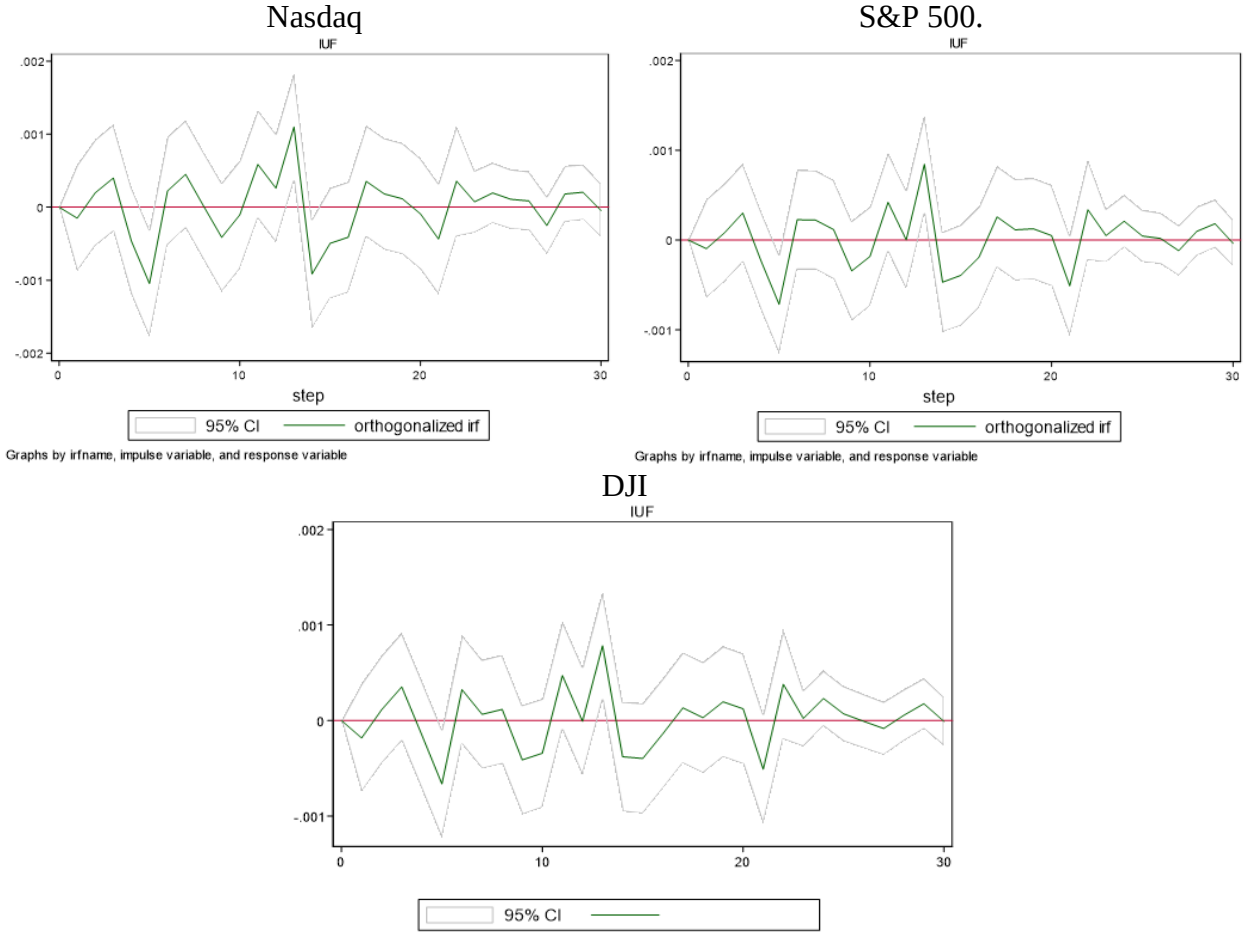


**Figure 2.** Impulse and response.

During the US-China trade conflict, the US tariffs imposed on China caused the appreciation of the US dollar and the depreciation of the RMB for a short period, but the possible economic consequences of exchange rate changes during that period were completely different from those during the free trade period.

The appreciation of the dollar will cause capital flows, and international capital markets and international floating capital will increase their holdings of the dollar due to profit-taking factors and short the yuan as the second trade conflict escalates. And the following changes may occur during the free trade period.

Firstly, an increase in international capital holdings of dollars is likely to result in a large inflow of dollars into the US equity or bond markets, an action that implies a net inflow of US domestic capital exists and, similarly, a net outflow of Chinese capital exists. The direct economic consequence of this behavior is an increase in stock prices or yields in the US stock market.

Second, a stronger dollar means more purchasing power for the dollar, which then must boost US imports, discourage exports by US firms, and boost Chinese exports and discourage Chinese imports. There are a large number of multinational firms in the US market, and suppressing exports will hurt these firms but will promote Chinese firms' interests. But in times of trade conflict, the United States has restricted imports of Chinese products by increasing high tariffs, and the Chinese government has countered the tariff restrictions. These actions would block a second channel in a period of trade freedom. From such an outcome, the trade conflict would seem to benefit the US market and harm China. But these actions could have created a new set of implications.

For example, there are electromechanical-related products on the list of tariffs imposed by the United States on China. China as the world's largest exporter of electromechanical products in recent years, and the US imports of electromechanical products into China are the first major category of US imports to China every year, and electromechanical products themselves have high technical requirements, and there is no way to have manufacturers to make sufficient substitute products in the short term. Summing up the above two points US domestic electromechanical goods will likely usher in a significant rise. This reflects the restriction of imports from China in part difficult to find short-term substitutes for goods that will significantly push up the price of the goods in the US mainland, and the import and export-dependent industries have a huge impact on the employment of related industries may also be affected. The source of these effects must be the US domestic consumers, and higher commodity prices will also dampen consumption to some extent and affect the earnings of US domestic enterprises.

In summary, the net impact of the trade conflict on US financial markets cannot be directly inferred from the theoretical analysis. Meanwhile, the impulse response function calculated in this paper shows that a single unit of exchange rate shock in period t=0 causes a shock market in the US stock market in the short term the future, i.e., the impact of a change in the exchange rate on the stock market is alternately positive and negative. It is still difficult to determine the magnitude of the net effect through impulse response plots alone (please see Figure 2).

Accordingly, the cumulative response function is further calculated in this paper.

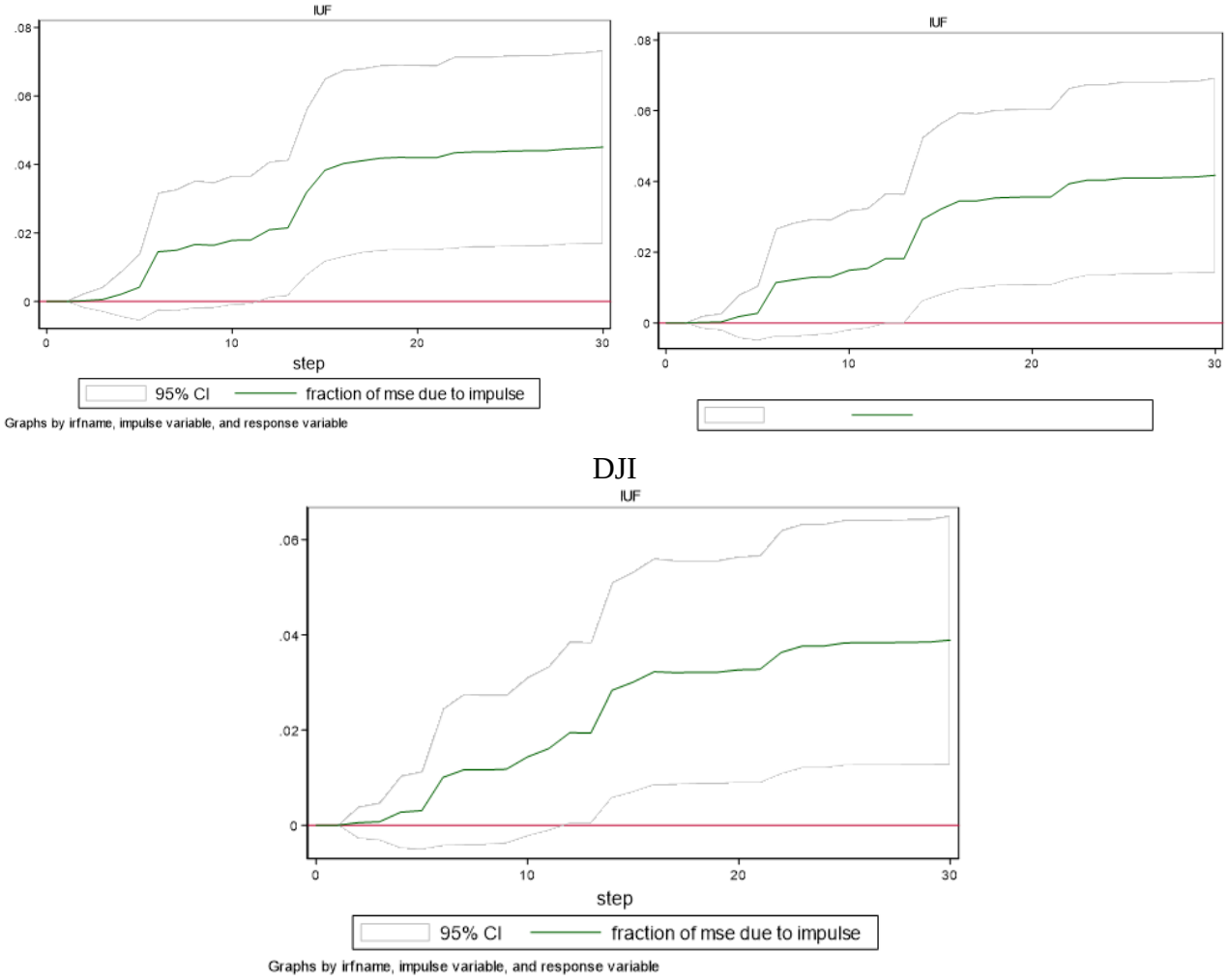


**Figure 3.** Cumulative response.

The results in Figure 3 show that the net effect of an increase in the exchange rate in period t=0 on the US stock market is positive, i.e., net capital inflows dominate the effect. The cumulative effect of a one-unit shock in period t=1 on the stock market over 30 periods is about 4%. In terms of time effects, shocks in the current period decay after 20 periods. The results of this paper can also explain the continued rise in the US stock market in 2018.

### 4.3. Order of ARMA model

To find the order of the ARMA model, this paper use PACF and ACF method. Using PACF and ACF to rank the log return series of the three indices used above and obtains the three plots shown below.

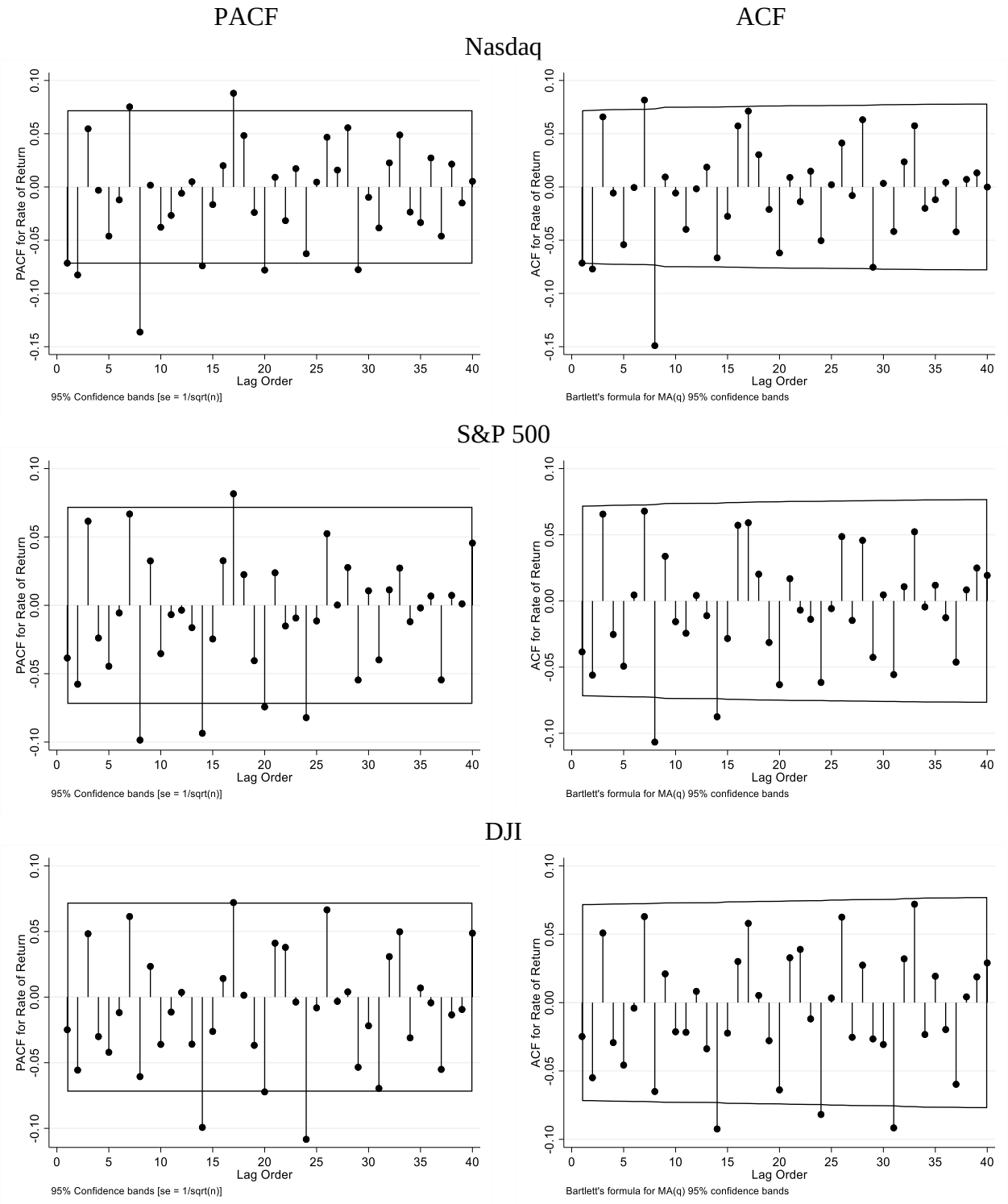


**Figure 4.** PACF and ACF.

From the 2 plots in the first row of Figure 4, the researchers find that the first part beyond the x-axis is 4 so it represents that p in AR (p) model for NASDAQ is 2 and MA (q) model has the same order 2 from the result in the figure. After analyzing the second and third-row plots in the same way, the research gets p, q in the ARMA model for the logarithmic return of the S&P 500 are both 8 and in the ARMA model for the logarithmic return of the Dow Jones are both 14.

### 4.4. ARMA-GARCH

To better estimate the model later, the time series of the log returns of the NASDAQ, S&P 500, and Dow Jones is first plotted.

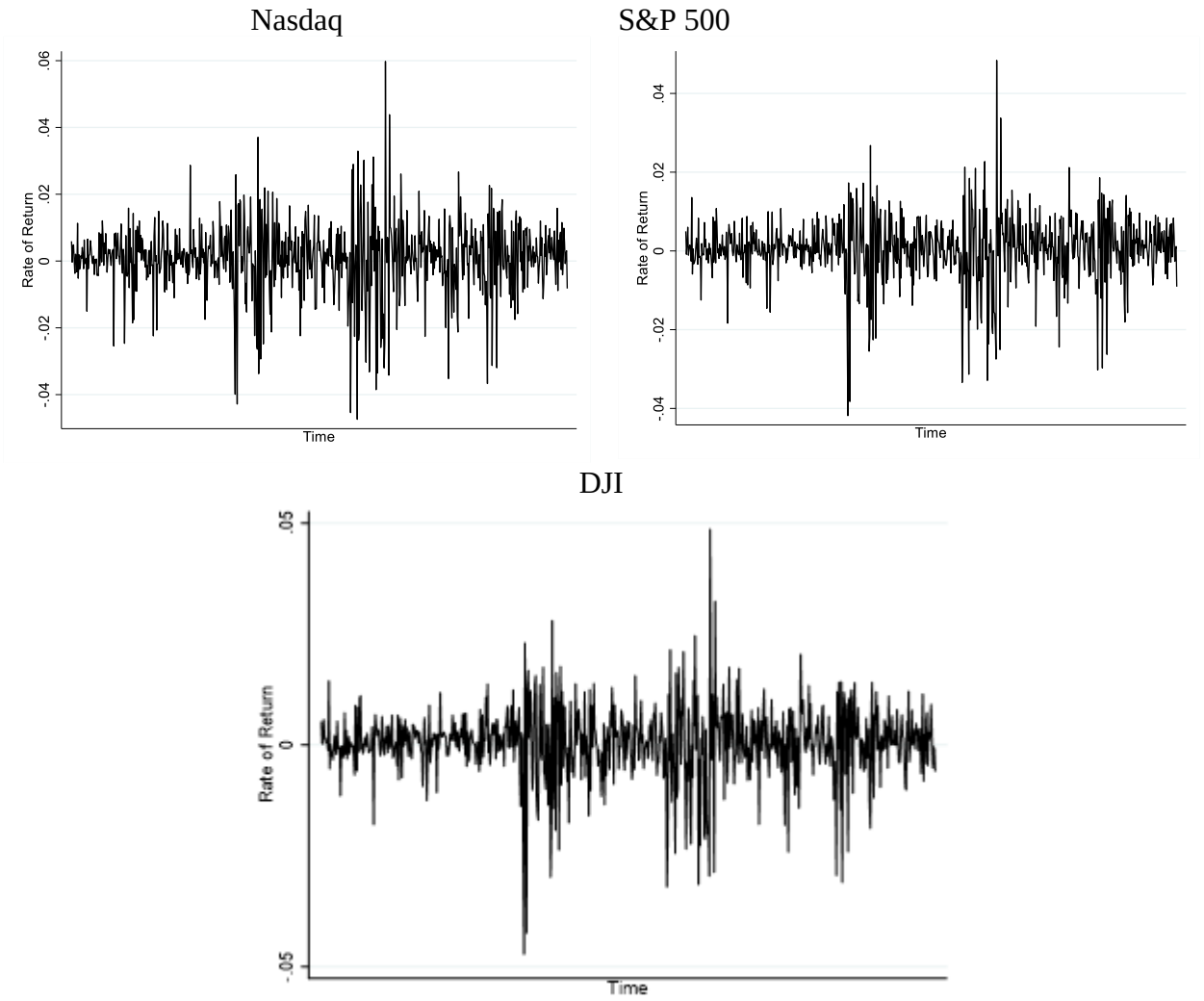


**Figure 5.** Yield.

From the time series plot, there is relatively significant conditional heteroskedasticity in the returns of the NASDAQ, S&P 500, and Dow Jones indices, but whether this effect is statistically significant requires further empirical testing. (Figure 5)

After including the log exchange rate return as an external explanatory variable in the variance equation this paper gets the following results

**Table 3.** ARMA-GARCHX estimation results 1.

| Variables | (1) Nasdaq | | (2) S&P 500 | | (3) DJI | |
|---|---|---|---|---|---|---|
| | Coefficient | p>\|Z\| | Coefficient | p>\|Z\| | Coefficient | p>\|Z\| |
| Exchange rate | 274.0011 | 0.000 | 357.8306 | 0.000 | 377.4138 | 0.000 |
| ARCH, L1 | 0.1311 | 0.000 | 0.1752 | 0.000 | 0.1514 | 0.000 |
| GARCH, L1 | 0.7963 | 0.000 | 0 .7669 | 0.000 | 0.7976 | 0.000 |
| Constant | -11.9703 | 0.000 | -12.8575 | 0.000 | -13.0170 | 0.000 |

From the 3-column model estimated in Table 3, the ARCH and GARCH terms of the NASDAQ, S&P 500, and Dow Jones index return series are significant after the mean equation controls for autocorrelation of returns, indicating that the returns of these three have conditional heteroskedasticity and satisfy the basic conditions of GARCH modeling.

In addition, from the estimation results of the external explanatory variables, a 1-unit increase in the log return of the exchange rate is associated with a 274.0011, 357.8306 and 377.4138 unit increase

in the fluctuation of the NASDAQ, S&P 500 and Dow Jones indices, respectively, with coefficients that are significant at the 1% level.

Putting the dummy variables converted from the point in time of the mutual tariff increase between the US and China are put into the variance equation as external explanatory variables, the following results can be obtained.

**Table 4.** ARMA-GARCHX estimation results 2.

| Variables | (1) Nasdaq | | (2) S&P 500 | | (3) DJI | |
|---|---|---|---|---|---|---|
| | Coefficient | p>\|Z\| | Coefficient | p>\|Z\| | Coefficient | p>\|Z\| |
| Dummy 1 | -0.5395 | 0.377 | -0.5387 | 0.523 | -0.1509 | 0.838 |
| Dummy 2 | 1.0185 | 0.100 | 1.4184 | 0.094 | 1.0748 | 0.146 |
| Dummy 3 | -0.1506 | 0.688 | -0.3056 | 0.465 | -0.4969 | 0.208 |
| Dummy 4 | 1.5984 | 0.013 | 2.0092 | 0.003 | 2.2711 | 0.000 |
| Dummy 5 | -2.5824 | 0.000 | -2.8129 | 0.000 | -2.7370 | 0.000 |
| ARCH, L1 | 0.1445 | 0.000 | 0.1895 | 0.000 | 0.1699 | 0.000 |
| GARCH, L1 | 0.7696 | 0.000 | 0.7316 | 0.000 | 0.7644 | 0.000 |
| Constant | -11.7240 | 0.000 | -12.5839 | 0.000 | -12.7623 | 0.000 |

The estimation results of the dummy variables in Table 4 show that the stock market fluctuation is not directly caused by the action of tariff increase. Combined with Table 3, this paper concludes that during this period, the changes in the US stock market were mainly caused by changes in the exchange rate.

## 5. Discussion

Similar to many previous studies the results of this paper shows that the trade war between the US and China has a significant impact on exchange rates and capital flows, with a one unit increase in the logarithmic rate of return on the exchange rate showing larger values for the fluctuation of all three major US stock indices and it is probabilistically significant. The difference from previous studies is that in the analysis of the impact on the fluctuation of the US stock market, the conclusions of this paper suggest that the tariff increase is not the direct cause of the fluctuation of US stocks, but that the cause of this change should be the change in the exchange rate of the two currencies after the tariff increase.

This study can help policymakers to measure the consequences of such a trade war. In terms of the fluctuation of the US stock market, it is caused by changes in the exchange rate, which in turn is caused by changes in the trade policies of both sides. Looking at the results the US stock market, despite the short-term increase in yields gained from the net inflow of capital for a short period, showed a notable decline as the Chinese side adjusted the reference rate for the yuan renminbi. It can be seen that changes in the exchange rate caused alternating positive and negative changes in the stock market, so no party can be sure of gaining in such a trade war.

Investors, must have a clear understanding of the market situation in the context of such trade wars and always pay attention to policy changes because the situation of trade wars can change rapidly and there is a high risk that only by being fully prepared can you profit from it.

## 6. Conclusion

The purpose of this paper is to explore how capital flows have changed and how the US stock market has been affected and to try to find the factors that have affected US stocks in the context of the US-China trade conflict. The article examines the impact of tariff increases on the exchange rate at key points in the US-China trade war through impulse response construction analysis and ARMA-GARCH modeling of the data and then analyzes the impact on capital flows. And the integrated

analysis of ARMA-GARCH model compares the magnitude of the impact of tariff hikes and exchange rate changes due to tariff changes on stock market movements. And conclude: during the US-China trade conflict, the appreciation of the US dollar due to the tariff hike in the short term caused capital flows, international capital markets, and international fluid capital to increase their holdings of the US dollar and short the RMB along with the escalation of the trade conflict; the net effect of the exchange rate increase on the US stock market is positive, and the cumulative effect of one unit shock on the stock market for 30 periods is 4% and starts to decay at 20 periods; the US The fluctuation in the US stock market is mainly caused by changes in the exchange rate rather than directly by the tariff increase.

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