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Trade War Risk and Valuations of Companies Listed Overseas: an Empirical Study on China Concept Stocks

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This article explores the impacts of the U.S.—China on the valuations of Chinese companies listed in the United States. The results reveal that the trade war negatively impacts the daily returns of Chinese concept stocks (CCSs). With other factors controlled for, as the U.S. TPU index rises, the daily returns of CCSs decrease remarkably, and their connection with the daily returns of bilateral markets is strengthened. Furthermore, we find that with the four stages of the trade war, namely, outbreak, truce, recurrence, and mitigation, the daily returns of CCSs have correspondingly fallen, stabilized, and then fallen and stabilized again.

Key Words: Overseas Listing; Investor Sentiment; China Concept Stocks; Valuation.
JEL Classification Numbers: F30, G14, G15.

1. INTRODUCTION

The globalization of stock markets (by means of overseas listing, cross-border transactions, etc.) is one of the most important manifestations of financial globalization. An underlying company may choose to list overseas to achieve the optimal stock price of the company worldwide. In recent decades, Chinese companies have not only issued shares on the Shanghai and Shenzhen stock exchanges in China but also have gone public on the stock exchanges of other countries. The most common ones are a battery of stocks of companies that are listed in the United States but have their main assets or revenues in mainland China (China concept stocks or

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CCSs).[1] Listing of Chinese companies on the U.S. stock market dates back to the 1990s, when the Chinese mainland market was in its early stage of development with limited market capacity and thus the dominant reason for Chinese companies to list in the United States was to acquire capital. Since then, the motives leading Chinese companies to list in the United States have gradually diversified and relate to lowering financing barriers and costs, increasing stock liquidity, increasing the level of internationalization, diversifying sources of capital, and increasing the value of the underlying company on all sides.

According to classic financial market theory, if international financial markets are completely integrated, a company's stock price fluctuations should not be influenced by its trading place. More specifically, some Chinese companies are listed on the China A-shares market and the stock markets of other countries at the same time. Their valuations correspond to the same cash flow, so the stocks of the same company on two markets should be priced the same after the exchange rate is taken into consideration (Chan et al., 2008). However, Gagnon and Karolyi (2010) analyzed data on the daily price of American depositary receipts (ADRs)[2] and found that a number of factors, including market supervision and legal issues, information asymmetry, and differences between trading places, hinder arbitrage and lead to price differences in the stocks of companies listed overseas after exchange rate adjustment.

Overseas listing of Chinese companies is not entirely uncomplicated. In March 2018, the United States started a trade war with China, which severely affected the economic growth and financial order of the two nations as well as other countries. As the reverse globalization and trade barriers provoked by the United States increased, the risk related to overseas listing of Chinese companies (especially in the U.S. stock market) received increasing attention. In the context of the trade war, CCSs are influenced by (1) regulatory and legal challenges in overseas markets, (2) changes in valuation caused by expected exchange rate fluctuations, and (3) international investor sentiment. All these problems exert a systematic negative influence on the valuation of CCSs.

[1] There are two points to note about CCSs. First, the CCS designation indicates only that the company's main assets or revenues are on the mainland, not necessarily that it also issues stock shares on the Shanghai or Shenzhen Stock Exchange in China. Second, CCSs include Chinese companies cross-listed in the United States, Hong Kong, London, etc. However, this paper focuses only on CCSs cross-listed in the United States.

[2] ADRs are negotiable securities issued by a U.S. depository bank representing a specified number of shares—usually but not always one share—of a foreign company's stock. ADRs trade on U.S. stock markets like any domestic share in the United States. In this article, a precondition for Chinese stocks listed in the United States, that is, China concept stocks, to issue ADRs is to be listed on the Hong Kong stock market.

In terms of economic indicators, stock market indices, and other related data, both countries experienced steady economic growth before the outbreak of the trade war. A bull market also prevailed in the two countries' stock markets, reflecting growth in financial markets in general. Moreover, industrial and financial circles in neither the U.S. and China nor other countries expected the trade war to be suddenly stirred up by the United States in March 2018; the trade war broke out suddenly. Taking this unexpected event as an exogenous shock, this paper studies whether the valuation of Chinese companies listed in the United States was negatively influenced by the U.S.—China trade war and, if so, whether the valuation of companies listed overseas was influenced more by policy enacted in the place of listing or in the location of their assets.

This paper uses panel data on CCSs to analyze the influence of trade war developments on the returns of Chinese stocks listed in the United States and verifies the negative impact of trade policy risk on these companies by taking the trade policy uncertainty (TPU) index as a proxy variable, incorporating dummy variables representing the different stages of the trade war into the model, and adopting an event study methodology to perform further analysis. In addition, this paper constructs a discount index of companies listed in China and the United States as a dependent variable, uses panel data to conduct a robustness check, and finds that these dual-listed companies have been significantly negatively impacted in the U.S. stock market during the U.S.—China trade war. Furthermore, this paper conducts two other robustness checks based on alternative proxies of the risk associated with the trade war, namely, the Google Trends index of news articles related to the U.S.—China trade war and bilateral U.S.—China tariffs, to verify the main results in basic models. Finally, the emergency phase, that is, the early stage of the outbreak of the COVID-19 pandemic, is used as a dummy variable to carry out a placebo test. The results offer proof of a significantly negative impact on CCSs in the context of uncertain U.S.—China relations and provide Chinese companies with a new method to assess the risk of overseas listing.

The structure of this article is as follows. Section II outlines the institutional background and literature review. Section III expounds on the sample and models. Section IV consists of the empirical analysis and conclusions. Section V presents three robustness checks. Section VI uses the exogenous shock of the COVID-19 pandemic as a dummy variable to conduct a placebo test. The last section offers the conclusions.

2. RESEARCH BACKGROUND AND LITERATURE REVIEW

2.1. The U.S.—China Trade War and Global Financial Market

The U.S.—China trade war originated with the Section 301 investigation memorandum signed by former U.S. president Trump on March 22, 2018. This document asserted that "China steals U.S. intellectual property and business secrets" and required the United States trade representative to impose tariffs on $60 billion of goods imported from China. Afterward, the Ministry of Commerce of China took countermeasures by imposing tariffs on 128 goods imported from the United States, raising the curtain on the U.S.—China trade war. Since then, the United States and China have been through rounds of exchanges of tariffs, each characterized by a cycle of initiation, negotiation, recurrence, and mitigation. Although the U.S.—China trade war has not yet entirely ended, it has entered a more complicated development stage since early 2020 with the influence of the COVID-19 pandemic. The trade war phase studied in this paper refers in particular to the period from March 22, 2018, to October 18, 2019, before the COVID-19 pandemic occurred. The timeline of the U.S.—China trade war (2018-2019) is shown in Appendix 1.

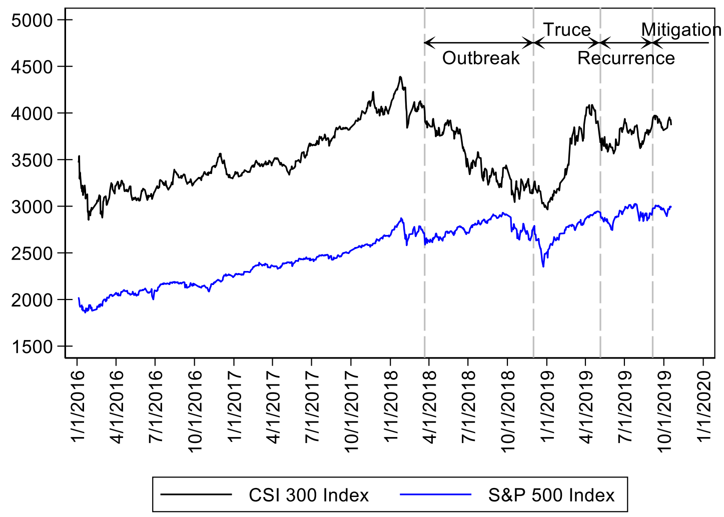
In the global economy, the trade war has severely damaged trade relations between the two countries as well as businesses and consumers. Li et al. (2018) and Itakura (2020) adopted a multinational general equilibrium model to evaluate and measure the negative impact of the U.S.—China trade war. In addition, in July 2018, according to a monthly survey conducted by The Wall Street Journal and consulting firm Vistage on over 750 small companies in the United States, optimism among small businesses hit its lowest level since the 2016 presidential election.[3] On August 17, 2018, the University of Michigan published its preliminary estimate of the American consumer sentiment index, which—at 95.3—hit a new low relative to its level in the previous 11 months; the survey also indicated that nearly 32% of respondents negatively viewed current American trade policies and documented U.S. consumers' concerns over the trade war.[4]

Furthermore, the development of capital markets has been significantly impacted by the U.S.—China trade war. As shown in Figure 1, when the trade war intensified in 2018, the CSI 300 index dropped by 31.89% from

[3]See updated article in The Wall Street Journal, August 8, 2018 ('We Are at the Limit': Trump's Tariffs Turn Small Businesses Upside Down; Link: https://www.wsj.com/articles/we-are-at-the-limit-trumps-tariffs-turn-small-businesses-upside-down-1533660467, accessed November 10, 2021).

[4]See the report "August Preliminary Results", published on the Surveys of Consumers website, August 17, 2018; Link: https://data.sca.isr.umich.edu/fetchdoc.php?docid=60954, accessed November 10, 2021). In the final report, the American consumer sentiment index for August 2018 is 96.2, slightly higher than the preliminary result of 95.3.

FIG. 1. Changes in the Closing Price of Chinese and U.S. Stock Market Indices from January 2016 to October 2019



4,390, its peak on January 24, 2018, to 2,990, the local minimum at the end of 2018, as the index as a whole saw a steady decline and higher volatility. The S&P 500 index continued to rise with oscillations at the early stage of the trade war but began to show a downward trend starting in September 2018 as the trade war escalated. After the trade war intensity was alleviated in early 2019, the CSI 300 index rebounded to 4,087 on April 17, 2019. However, when it re-escalated in May 2019, Chinese and U.S. stock market indices fluctuated again, and market performance was affected. Liu (2020) used Google Trends data to measure the severity of the trade war, with the results showing that it resulted in CNY depreciation and a fall in the Chinese stock market.

After the trade war started, European and U.S. stock markets slumped, and then the impact extended to Asia. On the day of the outbreak, the Dow Jones Industrial Average fell by 724.42, that is, 2.93%, while all the Asia-Pacific stock markets fell, with the largest fall exceeding 4%. As reported by Voice of America (VOA), affected by the intensification of the U.S.—China trade war, German gross domestic product (GDP) contracted. Meanwhile, in the second quarter, Britain went through a downturn for the first time in seven years; the economic growth rate of Italy was flat; and

Mexico experienced one quarter of negative economic growth.[5] A Chinese-language newspaper in Malaysia, China Press, pointed out that Malaysia's exports in August to multiple ASEAN countries fell by 0.8% from the last year's level, and its imports shrank by 12.5%, as it was affected by the trade war.[6]

2.2. The Trade Policy Uncertainty Index

The impacts and action mechanisms of uncertainty in the global economic system and financial markets have always been an issue of great concern for governments and companies. Bloom (2009) found that with the severe impacts of the Cuban missile crisis and the Kennedy assassination, monthly implied volatility in the U.S. stock market, which represents uncertainty, rose remarkably. A preliminary study conducted by Baker et al. (2013) found that feeble economic recoveries in American history have always come with a high level of policy uncertainty, which causes families and companies to restrain expenditure and investment and cut jobs substantially.

To measure U.S. TPU, Baker et al. (2016) used results from the Access World News Newsbank database of over 2,000 US newspapers to construct a frequency table of articles in these newspapers that discuss policy-related economic uncertainty and contain one or more references to trade policy.[7] Later, Davis et al. (2019) used two newspapers, The Renmin Daily and The Guangming Daily, to quantify China's economic policy uncertainty (EPU) and TPU indices. Appendix 4 shows the term sets related to China's EPU and TPU index construction. Both methods follow the news-based uncertainty index construction method for the United States and other countries proposed by Baker et al. (2016). The TPU indices of China and the United States used in the empirical research in this paper are from the studies conducted by Baker et al. (2016) and Davis et al. (2019), respectively.[8]

[5]See the report published on the Chinese Voice of America website, August 15, 2019; Link: https://www.voachinese.com/a/china-trade-stock-tariff-bond-20190815/5042454.html, accessed November 10, 2021).

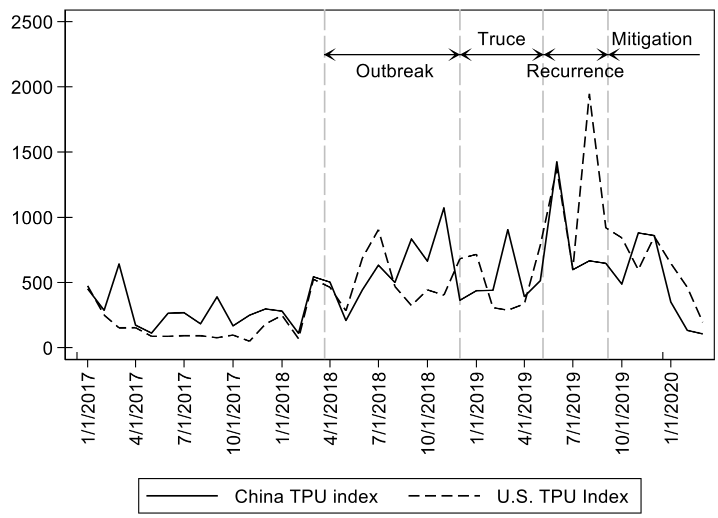
[6]See the report published on the website of the Malaysian Chinese-language newspaper China Press, October 4, 2019; Link: https://www.chinapress.com.my/20191004/8%E6%9C%88%E5%87%BA%E5%8F%A3%E6%84%8F%E5%A4%96%E8%B7%8C0-8-%E5%B0%A4%E5%85%B6%E5%AF%B9%E9%A6%99%E6%B8%AF%E8%A1%A8%E7%8E%B0%E6%9C%80%E5%B7%AE/, accessed November 10, 2021).

[7]The term set for TPU includes import tariffs, import duty, import barrier, government subsidies, government subsidy, WTO, World Trade Organization, trade treaty, trade agreement, trade policy, trade act, Doha round, Uruguay round, GATT, and dumping (see the page: https://www.policyuncertainty.com/categorical_terms.html).

[8]The TPU indices of the United States and China are available on the Economic Policy Uncertainty website, developed and maintained by Scott

Figure 2 shows the Chinese and U.S. TPU indices at monthly frequency from January 2017 to October 2019, where the vertical dotted lines represent the time points captured by several dummy variables representing different stages of the trade war used in this paper. The figure shows that the Chinese and U.S. TPU indices both fluctuated violently several times as the trade war developed. When the United States announced its withdrawal from the Trans-Pacific Partnership (TPP) agreement in March 2017, the Chinese TPU index increased significantly. Before the trade war broke out, from January to March 2018, the Chinese and U.S. TPU indices soared simultaneously, and a high level of uncertainty remained in both countries from 2018 to 2019. After China and the United States reached a preliminary decision on a truce on December 1, 2019, the TPU index of China dropped in the short term. Later, as the dispute subsequently recurred and eased, the TPU index of both countries showed clear ups and downs. This kind of trend suggests that the TPU index reflects the impact of the U.S.—China trade war under certain circumstances.

FIG. 2. Changes in the Chinese and U.S. TPU Indices from January 2017 to October 2019 (Monthly Data)



Relevant studies conducted by Caldara et al. (2020), Liow et al. (2018), Kido (2018), and Trung (2019) show that TPU weakens economic recovery

Baker, Nick Bloom, and Steven Davis based on their research Baker et al. (2016). More specifically, the download page links for U.S. and China TPU are https://www.policyuncertainty.com/categorical_epu.html and https://www.policyuncertainty.com/china_monthly.html, respectively.

and worsens unemployment in a country, and it has a serious impact on the financial market, transnational investment and other aspects. Davis et al. (2019) examined the impact of trade policy—related news events and TPU on the returns and volatility of the stocks of Chinese listed companies. Based on the study performed by Davis et al. (2019), this paper uses the TPU index as a proxy variable for trade policy risk to analyze its influence on the return rate of CCSs and the discount faced by dual-listed companies.

2.3. Returns of Companies Listed Overseas

Regarding the drivers of the price difference of cross-listed stocks, many studies have provided explanations from different points of view. Studying the determinants of the price fluctuations of ADRs, Kim et al. (2000) found that in addition to domestic underlying stock and exchange rate fluctuations, the performance of the U.S. market is one of the most important influencing factors. Burdekin and Redfern (2009) found that the ADR discount can be explained mainly by changes in the nondeliverable CNY to USD forward exchange rate. Studying the relationship between the discount of 401 ADRs linked to 23 countries and its relationship with the liquidity of the underlying stock during the sample period, Chan et al. (2008) found that changes in the ADR discount are positively correlated with changes in the ADR's liquidity and negatively correlated with the changes in the liquidity of the underlying stock and that there is a noticeable liquidity effect after changes in future exchange rate expectations and stock return expectations are controlled for.

Beyond these results, numerous studies have also found that differences in investor sentiment between different markets are also a possible reason why the price of the same stock differs across markets. A study conducted by Wang and Jiang (2004) found that under the influence of different market-specific risks and investor sentiment, H-shares perform more similarly to Hong Kong stocks than to mainland Chinese stocks. Arquette et al. (2008) found that relative to the discount of A-shares, the discounts of ADRs and H-shares are significantly influenced by changes in exchange rate expectations and investor sentiment differences. Expected exchange rate fluctuations can explain only 40% of the discount fluctuations; extra-market and firm-specific sentiment effects can partly explain the remainder of the changes. Burdekin and Redfern (2009) found that changes in investor preferences not only affect capital flows within China but also matter for the relative price of the stocks of Chinese companies in different places around the world and that the influence of investor sentiment on the stocks in other markets remains consistent and significant even if changes in exchange rate expectations, liquidity, and market-specific risk are controlled for.

Attention to overseas-listed companies still focuses on the relationship between dual-listed stocks and bilateral markets. This line of research initially concentrated on the connection between the price trends of closed-end federal funds and the trading market. Closed-end federal funds invest in emerging markets but raise capital by issuing stocks in the markets of developed countries. The price of these stocks is different from the net asset value of the fund portfolio. The stock price of a closed-end fund seems to be most closely linked with the market in which the stock is traded, while its net asset value is mainly related to the stock market where the fund is located (Froot and Dabora, 1999). A study performed by Bodurtha et al. (1995) found that the price trend of closed-end national funds on the U.S. market is related to the U.S. market while the price of its underlying stock is related to the foreign market where the stocks are traded. Chan et al. (2003) probed the delisting of Jardine Matheson in Hong Kong in 1994 and found that after being delisted, Jardine Matheson's return performance decoupled from the index of the Hong Kong market, where its core business is located, but became more closely related to the index of the Singaporean market, its stock trading place; the authors argued that price fluctuations are influenced by investor sentiment in the specific country. All of the above studies show that cross-listed stocks are more related to the stock trading market than to the stock market that generates cash flow.

3. DATA AND METHOD

3.1. Sample Description

The U.S.—China trade war broke out on March 22, 2018, approximately a year and a half from October 18, 2019, the end of our sample period. To obtain temporally balanced panel data to analyze the valuation changes of CCSs before and after the trade war, this paper sets the sample start date to January 3, 2017.

Since this paper studies the influence of trade policy risk on the overseas valuations of Chinese listed companies, we use the data of Chinese stocks listed in the United States. As of October 18, 2019, the end of our sample period, there were 231 Chinese stocks listed in the United States in total, including 131 ADRs and 100 common stock companies.

First, given that the pricing process for companies that have been listed for only a short period of time is not entirely clear, and to avoid an influence of excessive fluctuations of their stock prices on the analysis results, this paper rules out the stocks of companies listed for less than six months as of the start date, January 3, 2017. Specifically, we delete data on 102 companies listed after July 1, 2016, among Chinese concept stocks.

Second, since companies with smaller market capitalizations are unstable to some extent, which means their stock prices are prone to influence from many potential factors, we rank the remaining 129 CCSs that meet the data selection requirements according to their real-time market capitalization on

October 18, 2019, and keep only the top 35 CCSs by market capitalization as our final sample for analysis by the basic models in this paper. The final sample includes 32 American depositary receipts and 3 common stock companies, with the total market capitalization of these 35 companies accounting for 86.87% of that of the initial sample of 231 CCSs. In contrast, the total market capitalization of the 196 removed companies accounts for only 13.13%. In addition, compared to the average market capitalization of each stock on the Shanghai Stock Exchange[9], 21,203.33 million CNY (2,999.01 million USD), the lowest market capitalization among the final 35 firms (2,205.81 million USD) is still low. Therefore, to prevent a potential impact on the analysis results of stock observations with a small market capitalization, it is reasonable to keep the top 35 CCSs. Appendix 2 provides basic information on the sample of 35 Chinese companies listed in the United States.

Among the 35 cross-listed companies finally selected, 10 are listed on both the Chinese and the U.S. stock markets and are called dual-listed companies; the remaining 25 are listed in only the U.S. stock market. Later, using the data of these 10 dual-listed companies, we take the discount of each stock on the overseas stock market relative to its price on the domestic stock market as the dependent variable to carry out a robustness check and further verify the influence of trade policy risk on the overseas valuations of Chinese listed companies.

3.2. Model and Variable Definitions

The purpose of this paper is to examine the influence of trade policy risk on the valuation of Chinese companies listed in the United States, and two basic regression models are used. One takes the TPU index as a proxy variable for trade policy risk and provides micro-level evidence for its influence on Chinese companies listed in the United States. The other model incorporates dummy variables representing the different stages of the trade war and analyzes the impact of trade war developments on the returns of Chinese stocks listed in the United States to further verify the impact of trade policy risk on these companies. Finally, this paper adopts an event study methodology to explore the long-term impacts of the U.S.—China trade war on the returns of CCSs and the differences in impacts across different stages.

[9]See the Shanghai Stock Exchange website (Link: http://www.sse.com.cn/market/stockdata/overview/day/, accessed November 10, 2021). At the time of writing, the total market capitalization and the number of stocks listed on the Shanghai Stock Exchange were 33,268.018 billion CNY and 1,569 stocks, respectively.

3.2.1. Basic Model 1: Trade Policy Uncertainty Index

First, this paper uses the TPU index, which is frequently used in the existing literature as a proxy variable for trade policy risk, and panel data to conduct an individual fixed effects regression for Model 1 (see Equation (1)) to evaluate the effects of trade policy risk on the returns of CCSs.

$$\begin{aligned} ccs\_r_{it} &= \alpha_0 + \alpha_1 hs300\_r_t + \alpha_2 sp500\_r_t + \alpha_3 forward12M\_spot_t \\ &+ \beta_1 chn\_tpu_t + \beta_2 us\_tpu_t + \gamma_1 chn\_tpu_t * hs300\_r_t \\ &+ \gamma_2 us\_tpu_t * sp500\_r_t + A_i + \varepsilon_{it} \end{aligned} \tag{1}$$

where i denotes the individual share ($i = 1, 2, \ldots, 35$) and t denotes the trading day ($t = 1, 2, \ldots, 657$).

In Model 1, $ccs\_r_{i,t}$ is the dependent variable representing the logarithmic returns of CCSs. The logarithmic returns $r_{i,t}$ in the model are constructed by the closing price $p_{i,t}$ and the closing price of the last trading day $p_{i,t-1}$, following Equation (2):

$$r_{i,t} = \ln\left(\frac{p_{i,t}}{p_{i,t-1}}\right) \tag{2}$$

The independent variables $hs300\_r_t$ and $sp500\_r_t$ are the logarithmic returns of the CSI 300 and S&P 500 indices, respectively, and are used to control for the influence of the Chinese and U.S. stock market indices on the returns of CCSs.

Given that the stock returns of cross-listed companies are also influenced by changes in the two countries' exchange rate expectations, Aggarwal (1981) conducted a microanalysis of monthly data for the U.S. stock market and found that the exchange rate has a positive influence on both the stock price of a multinational corporation and the returns of the whole stock market. Kim et al. (2000) studied ADR pricing factors and found that although the underlying stock price is the most important factor, the exchange rate and the U.S. market index also have a significant impact on the ADR price. Bailey et al. (2000) conducted a study of ADR returns and found that since an ADR is denominated in U.S. dollars and its underlying stock is denominated in domestic currency, domestic currency depreciation against the U.S. dollar leads to a lower return of the ADR. This paper also takes into consideration the influence of the exchange rate on the returns of CCSs, drawing on the study conducted by Arquette et al. (2008), and constructs a proxy variable for expected exchange rate fluctuations in accordance with Equation (3):

$$\begin{aligned} & \text{forward12M\_spot} \\ = \; & \text{12month closing price of forward USD to CNY exchange contract} \\ - \; & \text{closing price of spot USD to CNY exchange contract} \end{aligned} \tag{3}$$

Since the price of a forward contract can partly reflect investor expectations of the future exchange rate, if this difference increases, it means that investors expect USD appreciation against CNY in the future, which means that the discount of U.S. stocks relative to A-shares will be higher, and A-shares will become relatively cheap.

The U.S. and the Chinese TPU indices used in this paper are built from monthly data from an economic policy uncertainty website (http://www.policyuncertainty.com; for detailed download links, see footnote 8 in Section 2.2) and developed based on newspaper coverage frequency. The U.S. TPU index that we use is a category-specific policy uncertainty index developed by Baker et al. (2016). They used an audit study relying on human readings of 12,000 randomly sampled articles to select the policy terms and then used the scaled frequency counts of newspaper articles that contain the selected terms about economics, policy, and uncertainty to construct their uncertainty indices. They provided evidence that TPU indices constructed with the text search method are useful proxies for economic and policy conditions. The Chinese TPU index that we use is constructed by Davis et al. (2019), following Baker et al. (2016), also based on newspaper coverage frequency. Unlike Baker et al. (2016), Davis et al. (2019) used tools from natural language processing (NLP) instead of labor-intensive audit studies to select their policy-related terms.

When considering the influence of the TPU index on the valuation of CCSs, this paper standardizes the TPU indices to ensure the uniformity of data formats:

$$\text{Standardized tpu} = \frac{\text{TPU} - \min \text{TPU}}{\max \text{TPU} - \min \text{TPU}} \tag{4}$$

In the model, chn_tpu_t and us_tpu_t denote the standardized Chinese and U.S. TPU indices, which are the core variables in this paper. We analyze how TPU in the two countries influences the returns of stocks listed overseas as well as the key independent variables to explore how the trade war influenced the returns of these stocks after the Ministry of Commerce of China took countermeasures. Given that Chinese and U.S. stock market indices are at different levels, the influence of the TPU index of each country on the returns of CCSs may differ, so Model 1 also incorporates interactions of the returns of the corresponding market in China and the United States and the TPU index of the corresponding country.

A_i denotes fixed effects of individual stocks, namely, time-invariant effects for each stock.

Except for the standardized trade uncertainty data, the other data in this model are all daily data from the WIND database.

3.2.2. Basic Model 2: Trade War Dummy Variables

After we examine the influence of the TPU index, as a proxy variable for trade policy risk, on the valuations of CCSs, this section includes dummy variables representing the different stages of the trade war in the model and estimates a fixed effects regression for panel data to analyze how trade policy risk drove changes in the returns and valuations of CCSs at different stages of the trade war. Equation (5) corresponds to Basic Model 2:

$$\begin{aligned} ccs\_r_{i,t} &= \alpha_0 + \alpha_1 hs300\_r_t + \alpha_2 sp500\_r_t + \alpha_3 forward12M\_spot_t + \sum_{s=1}^{\bar{S}} \beta_s us_s \\ &+ \sum_{s=1}^{\bar{S}} \gamma_{1s} hs300\_r_t * us_s + \sum_{s=1}^{\bar{S}} \gamma_{2s} sp500\_r_t * us_s + A_i + \varepsilon_{it} \end{aligned} \tag{5}$$

where i represents the individual share ($i = 1, 2, \ldots, 35$), t represents the trading day ($t = 1, 2, \ldots, 657$), and s denotes the four stages of the U.S.—China trade war, namely, outbreak, truce, recurrence, and mitigation ($s = 1, 2, 3, 4$).

In Model 2, the definitions of the variables $ccs\_r_{i,t}$, $hs300\_r_t$, $sp500\_r_t$ and $forward12M\_spot_t$ are consistent with the definitions in Model 1. A major difference between Model 1 and Model 2 is that Model 2 incorporates the dummy variable us_s. When $\bar{S} = 1$ in Model 2, the regression analysis examines the influence of the trade war before and after the outbreak only; when $\bar{S} = 4$ in the model, the regression probes the effects generated on the returns of CCSs at each stage of the trade war, where us_s ($s = 1, 2, 3, 4$) represents the dummy variable denoting a stage of the trade war (see Table 1).

TABLE 1.

Definitions of Dummy Variables and Related Events in Each Stage

Dummy Variable	Definition	Event
us_1	1 after March 22, 2018, 0 otherwise	The outbreak of the U.S.—China trade war: The United States president announced tariffs on \$60 billion of goods imported from China, then the Ministry of Commerce of China took countermeasures by imposing tariffs on 128 goods imported from the United States.
us_2	1 after December 1, 2018, 0 otherwise	A truce in the U.S.—China trade war: The two countries' heads reached a consensus at the G20 summit in 2018 and announced they would stop taking new trade measures and begin a three-month negotiation.
us_3	1 after May 6, 2019, 0 otherwise	Recurrence of the U.S.—China trade war: The United States president announced an increase in the tariffs on \$200 billion of Chinese goods from 10% to 25%, effective on May 11.
us_4	1 after September 5, 2019, 0 otherwise	Mitigation of the U.S.—China trade war: The vice premier of the State Council of China and the United States trade representative and Treasury secretary decided via a call to hold the 13th round of China—U.S. high-level trade consultations in Washington in early October.

3.2.3. Basic Analysis: Event Study Framework[10]

To explore the long-term impacts of the U.S.—China trade war on the returns of CCSs and the differences in impacts across the different stages, we use an event study methodology to perform further analysis based on Model 2. The estimation model that we use to measure expected returns is as follows:

$$ccs\_r_{i,t} = \alpha_0 + \alpha_1 hs300\_r_t + \alpha_2 sp500\_r_t + \alpha_3 forward12M\_spot_t + \varepsilon_{it} \tag{6}$$

This estimation model, following Basic Model 2, is a variant of the commonly used market model in event study research. However, considering that CCSs are related to the stock trading market and the stock market that generates cash flow, the market model that we use in this section, un-

[10]We thank anonymous reviewers for comments related to this section.

like the typical market model in the literature, includes expected exchange rate fluctuations and both Chinese and U.S. stock market indices.

We set March 22, 2018, as the event day (Day 0) and use daily stock price data for the whole year of 2017 (January 3, 2017, to December 29, 2017). In other words, our estimation window is $[-288, -52]$.

The framework of the event study is as follows. First, we use the observations from the estimation window and the estimation model to obtain the estimated parameters. Second, we use observations for days after January 1, 2018, and the estimated models from the first step to obtain the expected returns. Finally, we can calculate the abnormal returns (ARs) and cumulative abnormal returns (CARs) according to the actual daily returns (ccs_r_{it}) and the expected returns ($E(ccs\_r_{it})$). The cumulative abnormal return is the sum of abnormal returns during a specific period.

$$AR_{i,t} = ccs\_r_{it} - E(ccs\_r_{it}) \tag{7}$$

$$CAR_i = \sum_{t_1}^{t_2} AR_{i,t} \tag{8}$$

3.2.4. Descriptive Statistics of Variables

Table 2 reports the descriptive statistical results of the main variables in the regressions in Models 1 and 2. The time span of the data is from January 3, 2017, to October 18, 2019, covering a total of 657 trading days. The TPU indices are at monthly frequency, so the TPU index of each company in the same month is the same, but all other data are at daily frequency.

The descriptive statistical results for the variables in the table above show that the means (standard deviations) of the dependent variable $ccs\_r_{i,t}$ and the core independent variables chn_tpu_t and us_tpu_t analyzed in the basic model of this paper are 0.0006 (0.0289), 0.2775 (0.2147), and 0.2128 (0.2157), respectively; that is, the standard deviations are higher than the means, which suggests that within the sample, the returns of CCSs and Chinese and U.S. TPU indices are highly volatile. In terms of time span, the numbers of observations before and after the outbreak of the trade war are basically identical, corresponding to a relatively balanced data structure.

TABLE 2.

Descriptive Statistics of the Main Variables in the Basic Models

Variable	Definition	Obs.	Mean	Sd.	Min.	Max.
ccs_r_{it}	Log return of CCSs	22995	0.0006	0.0289	−0.3168	0.4444
chn_tpu_t	Standardized U.S. TPU index	34	0.2775	0.2147	0.0000	1.0000
us_tpu_t	Standardized Chinese TPU index	34	0.2128	0.2157	0.0000	1.0000
$forward12M\_spot_t$	Changes in exchange rate expectations	657	0.0562	0.0525	−0.0567	0.1405
$hs300\_r_t$	Log return of CSI 300 Index	657	0.0002	0.0115	−0.0602	0.0578
$sp500\_r_t$	Log return of S&P 500 Index	657	0.0005	0.0084	−0.0418	0.0484

4. EMPIRICAL RESULTS AND ANALYSIS

4.1. Basic Model 1: Trade Policy Uncertainty Index

Table 3 reports the regression results with the logarithmic return of CCSs as the dependent variable and the TPU Index as a proxy variable for trade policy risk. The regression results shown in Column (4) of the table correspond entirely to Model 1, namely, Equation (1). In each regression in Table 3, we control for Chinese and U.S. market performance factors, namely, the logarithmic return of the CSI 300 and S&P 500 indices. A large number of papers have shown that the exchange rate between the two countries has an influence on the stock price of transnational corporations, so relative to Columns (1) and (3), Columns (2) and (4) additionally control for the influence of expected exchange rate fluctuations. Given that the influence of the TPU index of the corresponding country on the returns of CCSs may differ when Chinese and U.S. stock market indices are at different levels, relative to Columns (1) and (2), Columns (3) and (4) add interactions of the Chinese and U.S. TPU indices and the return of the market index of the corresponding country.

In the four models in the table above, the regression coefficients of us_tpu are all significantly negative, but the regression coefficients of chn_tpu are not significant, which suggests that the returns of CCSs are significantly negatively influenced by U.S. TPU but basically are not influenced by Chi-

TABLE 3.

Analysis of the Influence of the TPU Index on the Logarithmic Return of CCSs

Dependent variable: ccs_r				
Independent variable	(1)	(2)	(3)	(4)
chn_tpu	−0.001	−0.001	−0.002	−0.001
	(0.001)	(0.001)	(0.001)	(0.001)
us_tpu	-0.003^{***}	-0.002^{***}	-0.003^{***}	-0.002^{***}
	(0.001)	(0.001)	(0.001)	(0.001)
hs300_r	0.406^{***}	0.406^{***}	0.353^{***}	0.355^{***}
	(0.035)	(0.035)	(0.043)	(0.042)
sp500_r	1.039^{***}	1.039^{***}	0.972^{***}	0.972^{***}
	(0.07)	(0.071)	(0.069)	(0.069)
forward12M_spot		0.008		0.007
		(0.006)		(0.006)
chn_tpu∗hs300			0.154^{*}	0.148^{*}
			(0.083)	(0.081)
us_tpu∗sp500			0.223^{***}	0.222^{***}
			(0.062)	(0.062)
Fixed effects	Yes	Yes	Yes	Yes
Observations	22995	22995	22995	22995
R^2	0.135	0.135	0.135	0.135

Note: Standard errors are in parentheses; * denotes significance at the 90% level, ** denotes significance at the 95% level, and *** denotes significance at the 99% level.

nese TPU. In other words, when U.S. TPU reaches its maximum in an extreme case (the standardized TPU index is 1), relative to trade risk reaching its minimum, the returns of CCSs listed in the United States decreases by approximately 0.3%. This influence approaches 0.2% after exchange rate expectations and the aforementioned interaction terms are controlled for.

In Models (1) and (2) in the table above, the coefficients of hs300_r and sp500_r are significantly positive and exceed 40% and 100%, respectively; we can see that the returns of CCSs listed in the United States are less related to the Chinese stock market but are significantly more related to the trading market, namely, the United States stock market. After Models (2) and (4) take the influence of expected exchange rate fluctuations into account, the estimated coefficients of hs300_r and sp500_r experience only minor changes.

In Models (3) and (4), the estimated coefficients of chn_tpu∗hs300 and us_tpu∗sp500, the interactions of the Chinese and U.S. TPU indices and the return of the market index of the corresponding country are significantly positive, which suggests that there is an interplay between the effects of Chinese and U.S. TPU and those of the Chinese and U.S. stock market indices on the returns of CCSs. When the logarithmic returns of the CSI 300 and S&P 500 indices are higher—in other words, when the overall market performs better—it can neutralize the negative impact of trade uncertainty on the returns of CCSs to a small degree (the estimated coefficients of chn_tpu∗hs300 and us_tpu∗sp500 are significantly positive, but the regression coefficients of us_tpu are all significantly negative, and the regression coefficients of chn_tpu are not significant, yet are all negative).

Result 1: The returns of CCSs are significantly negatively influenced by U.S. TPU but basically are not influenced by Chinese TPU.

Result 2: When the overall market performs better, it can neutralize the negative impact of trade uncertainty on the returns of CCSs to a small degree.

4.2. Basic Model 2: Trade War Dummy Variables

Table 4 reports the regression results with the logarithmic return of CCSs as the dependent variable, and dummy variables representing the different stages of the U.S.—China trade war are incorporated into the model to examine the influence of trade policy risk. Column (2) in the table corresponds to Model 2, namely, the regression results of Equation (5) when $\bar{S} = 1$, while Column (4) corresponds to the regression results in Model 2 when $\bar{S} = 4$. The first two columns of the table consider only the overall impact of the trade war; Columns (3) and (4) incorporate dummy variables representing the different stages of the trade war to study the influence of trade policy risk. Compared with Columns (1) and (3), Columns (2) and (4) additionally control for the influence of expected exchange rate fluctuations.

The regression model corresponding to the first two columns incorporates dummy variables for the periods before and after the outbreak of the trade war only. The results show that before the outbreak of the trade war, the correlation between CCS returns and the U.S. stock market was stronger than the correlation between CCS returns and the Chinese market, as the coefficient for the former is close to 100% and significant at 1% yet that for the latter is only approximately 30%. In Column (2), after the model additionally incorporates the influence of expected exchange rate fluctuations, the coefficient experiences only minor changes relative to its counterpart in Column (1). The coefficient of the trade war dummy variable us1 is significantly negative (-0.002), which indicates that when the Chinese and

TABLE 4.
Analysis of the Influence of the Different Stages of the Trade War on the Logarithmic Return of CCSs

Dependent variable: ccs_r				
Independent variable	(1)	(2)	(3)	(4)
hs300_r	0.321^{***}	0.316^{***}	0.321^{***}	0.317^{***}
	(0.05)	(0.05)	(0.05)	(0.05)
sp500_r	0.974^{***}	0.973^{***}	0.974^{***}	0.973^{***}
	(0.081)	(0.081)	(0.081)	(0.081)
forward12M_spot		-0.023^{***}		-0.019^{***}
		(0.005)		(0.005)
us1	-0.002^{***}	-0.004^{***}	-0.002^{***}	-0.004^{***}
	(0.001)	(0.001)	(0.001)	(0.001)
us2			0.001	0
			(0.001)	(0.001)
us3			-0.002^{**}	-0.001^{*}
			(0.001)	(0.001)
us4			-0.001	-0.001
			(0.001)	(0.001)
Interaction of dummy variable and market return	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes
Observations	22995	22995	22995	22995
R^2	0.136	0.136	0.138	0.139

Note: Standard errors are in parentheses; * denotes significance at the 90% level, ** denotes significance at the 95% level, and *** denotes significance at the 99% level.

U.S. stock markets were stable, the outbreak of the trade war made the returns of Chinese companies listed in the United States decrease by a remarkable 0.2% relative to their level before the outbreak; this estimate has greater significance after expected exchange rate fluctuations are taken into account.

Moreover, in Models (2) and (4), the coefficients of expected exchange rate fluctuations are all significantly negative, which suggests that greater expected USD to CNY exchange rate fluctuations have a negative influence on the stock returns of Chinese companies listed in the United States; that is, expected appreciation of the U.S. dollar will lead to a decrease in the returns of CCSs. In research regarding the returns of ADRs, Kim et al. (2000) and Bailey et al. (2000) pointed out that domestic currency depreciation against the U.S. dollar causes the returns of American depositary receipts to decrease. Therefore, the findings of this paper on the influence of expected USD to CNY exchange rate fluctuations on the returns of CCSs are consistent with those of previous literature.

Models (3) and (4) in Table 4 incorporate dummy variables representing the different stages of the trade war and corresponding interactions. In terms of the regression coefficients of us1, us2, us3 and us4, the outbreak (first stage) and recurrence (third stage) of the trade war had a significantly negative impact on the returns of CCSs, while the truce (second stage) and mitigation (fourth stage) did not exert a significant influence on stock returns. After the factors regarding the two markets and exchange rate are controlled for, the four stages of the U.S.—China trade war, namely, the outbreak, truce, recurrence, and mitigation phases, notably correspond to a fall, stabilization, and then another fall and stabilization in the returns of CCSs. Models (1) and (2) show that the returns of CCSs declined during the whole trade war.

Result 3: After the factors regarding the two markets and exchange rate are controlled for, the four stages of the U.S.—China trade war, namely, the outbreak, truce, recurrence, and mitigation phases, correspond to a fall, stabilization, and then another fall and stabilization in the returns of CCSs.

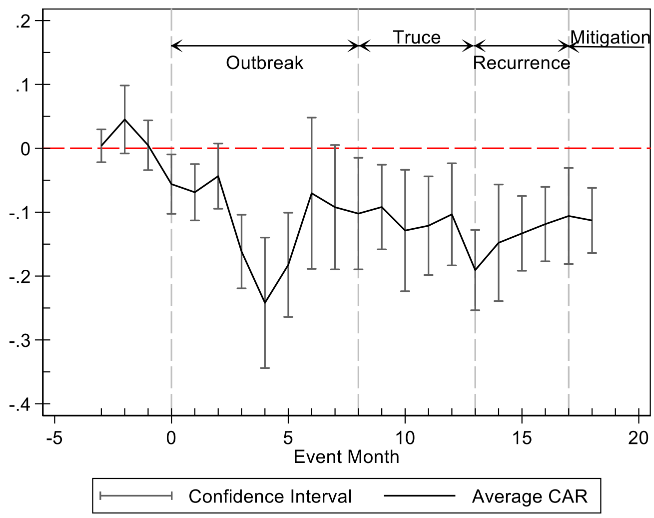
4.3. Basic Analysis: Event Study Framework

To clearly display the long-term impacts of the U.S.—China trade war on the returns of the CCSs, we calculate the monthly CARs for individual CCSs after January 1, 2018. We denote March 22, 2018, to April 21, 2018, as Event Month 0, and the periods of other event months are analogous.

Figure 3 shows the changes in the average monthly CAR from Event Month −3 (January 1, 2018, to January 21, 2018) to Event Month 18 (September 22, 2019, to October 18, 2019) and the confidence interval across the 35 CCSs. The x-axis represents the event month. The beginning event months of the truce, recurrence, and mitigation stages are Event Months 8 (November 22, 2018, to December 21, 2018), 13 (April 22, 2019, to May 21, 2019), and 17 (August 22, 2019, to September 21, 2019), respectively.

The figure shows a sharp decrease in monthly CARs in Event Month 3 (June 22, 2018, to July 21, 2018), with July 6, 2018, the day when U.S. tariffs on $34 billion of Chinese goods came into effect, falling in this period. In addition, we can see slight waves between different stages of the trade war. The CARs of the truce stage were at a slightly higher level than those of the outbreak stage. When the recurrence stage began, CARs dropped remarkably. CARs climbed slightly after the mitigation stage began.

FIG. 3. Changes in Average Monthly CARs from Event Month −3 to Event Month 18



To test for differences in ARs across stages and examine the different impacts of the four stages on the returns of CCSs, we first report descriptive statistics of daily ARs during the four stages (see Table 5) and then use Mann—Whitney U tests to compare the results of the daily ARs across the four stages.

TABLE 5.

Descriptive Statistics of Daily ARs during the Four Stages

Panel A: Stage definition consistent with Basic Model 2						
Daily ARs	Date Range (M/D/Y)	N	Mean	Sd.	Min.	Max.
Before Trade War	1/1/2018—3/21/2018	1785	0.0010	0.0288	−0.1383	0.2573
Outbreak	3/22/2018—11/30/2018	5775	−0.0058	0.0301	−0.2840	0.1766
Truce	12/1/2018—5/5/2019	3255	−0.0061	0.0299	−0.2414	0.1837
Recurrence	5/6/2019—9/4/2019	2940	−0.0070	0.0240	−0.3184	0.1317
Mitigation	9/5/2019—10/18/2019	910	−0.0066	0.0277	−0.2275	0.1060
Panel B: Slightly modified definitions of Before Trade War and Outbreak stages						
Daily ARs	Date Range	N	Mean	Sd.	Min.	Max.
Before Trade War	1/1/2018—7/5/2018	4130	−.0018	0.0279	−0.2840	0.2574
Outbreak	7/6/2018—11/30/2018	3430	−.0070	0.0320	−0.2466	0.1766

Table 5 shows the descriptive statistics of daily ARs during the four stages. In Panel A, the stage period definitions that we use are the same as those in Basic Model 2. Before July 6, 2018, the day when U.S. tariffs on $34 billion of Chinese goods came into effect, many people still held a wait-and-see attitude on whether a trade war would break out and continue. Therefore, we slightly modify the date range of the Before Trade War and Outbreak stages. The descriptive statistics of daily ARs according to the modified stage definitions are displayed in Panel B of Table 5. Because the spans of the truce, recurrence, and mitigation periods in Panel B are the same as those in Panel A, their descriptive statistics are not displayed in Panel B.

TABLE 6.

Comparison of Daily ARs across the Four Stages (Mann—Whitney U Tests)

Panel A: Stage definition consistent with Basic Model 2				
ARs (Single-sided)	Outbreak	Truce	Recurrence	Mitigation
Before Trade War	7.485***	7.205***	10.080***	5.877***
Outbreak		0.315	3.947***	0.611
Truce			3.271***	0.608
Recurrence				−2.067**
Panel B: Slightly modified definitions of Before Trade War and Outbreak stages				
ARs (Single-sided)	Outbreak	Truce	Recurrence	Mitigation
Before Trade War	8.120***	6.139***	9.795***	4.844***
Outbreak		−2.092**	0.930	−0.870

Note: The stage definitions in Panel A are the same as those in Panel A of Table 5. The stage definitions in Panel B are the same as those in Panel B of Table 5. The numbers indicate Z values of Mann—Whitney U tests. *, **, and *** represent p values smaller than 0.10, 0.05, and 0.01, respectively, for single-sided tests.

Table 6 reports the comparison results for daily ARs across the four stages based on Mann-Whitney U tests. The results of the first row in Panel A and Panel B are significantly positive, which means that daily ARs were lower after the trade war broke out; namely, the returns of CCSs were negatively influenced by the trade war. This evidence confirms Result 1.

The results on the diagonal line in the two panels compare the ARs between two adjacent stages, supporting Result 3 drawn from Basic Model 2. The Z values of Before Trade War vs. Outbreak (7.485***), Truce vs. Recurrence (3.271***), and Recurrence vs. Mitigation (−2.067**) show that the returns of CCSs decreased abnormally during the outbreak and recurrence stages and increased during the mitigation stage in comparison to those in the prior adjacent stage. After we modify the definition of the outbreak start date, we find that the returns of CCSs also increased significantly during the truce stage in comparison to those in the prior stage—the outbreak stage (-2.092^{**}).

5. ROBUSTNESS CHECKS

5.1. Discount Rate of Companies Listed on Both the Chinese and U.S. Markets

We can find from the analysis of the basic models above that the connection between the returns of CCSs and bilateral markets was significantly higher before and after the trade war and that the returns of CCSs changed over the stages of the U.S.—China trade war after market factors and exchange rate factors are controlled for. In this section, we use the discount of companies listed on both the Chinese and U.S. stock markets as a dependent variable to conduct a robustness check and find that the influence of trade policy risk on the relative returns of the same company in the two markets shows a pattern similar to that of the returns of CCSs.

For the robustness check in this section, this paper chooses a total of 10 companies listed on both the A-shares market and the U.S. stock market from among the 35 cross-listed companies involved in the basic models; the sample period in this section is consistent with that considered in the basic models. Appendix 3 sets forth basic information about the 10 companies involved in this section.

The dependent variable used in this section is the discount of U.S. shares of dual-listed companies relative to the price of A-shares, and it is constructed in accordance with Equation (9):

$$\text{discount}_{US_A} = \frac{\text{price}_{US} - \dfrac{\text{price}_A}{\text{exchange}_{A\_US}}}{\dfrac{\text{price}_A}{\text{exchange}_{A\_US}}} \tag{9}$$

price_{US} denotes the share price of one unit (the quantity unit of stocks on the U.S. stock market) on the U.S. stock market, measured in USD.

$\text{price}_A = A -$ share price $*$ quantity conversion rate, where the A-share price denotes the price of one unit (the quantity unit of stocks on the A-shares market) on the A-shares market, measured in CNY. The quantity conversion rate is represented by the variable N, which means that one ADR unit traded in the United States and denominated in USD can be converted into N units of A-shares traded in China and denominated in CNY;

different stocks have different quantity conversion rates. exchange_{A_US} represents the USD-to-CNY spot exchange rate.

In the robustness check in this section, we pay attention to how the stock discount of companies listed in both China and the United States on the U.S. stock market relative to the price on the A-shares market is influenced by trade uncertainty. In Equation (9), the discount reflects the difference between the share prices of the same Chinese company on the U.S. and Chinese stock markets. The higher the discount is, the higher the company's international valuation relative to its domestic valuation; and the lower the discount is, the higher its domestic valuation relative to its international valuation. Model 3, which is to be estimated in this section, is as shown in Equation (10):

$$\begin{aligned} \text{discount}_{US\_A_{it}} &= \alpha_0 + \alpha_1 hs300\_r_t + \alpha_2 sp500\_r_t + \alpha_3 forward12M\_spot_t \\ &+ \beta_1 chn\_tpu_t + \beta_2 us\_tpu_t + \gamma_1 chn\_tpu_t * hs300\_r_t \\ &+ \gamma_2 us\_tpu_t * sp500\_r_t + A_i + \varepsilon_{it} \end{aligned} \tag{10}$$

The only difference between this model and Model 1 is that the dependent variables used by them are different: the dependent variable in Model 1 is the returns of CCSs, whereas this model uses the price discount of dual-listed companies on the U.S. stock market relative to the price on the A-shares market as the dependent variable. The definition of the independent variable included in this model is the same as that in Model 1.

Table 7 below reports the descriptive statistical results of the variables in the regression in Model 3. The regression analysis in this section uses panel data on the 10 companies listed in both countries, and the sample period is consistent with the that used in the basic models. Since the discount needed for the analysis in this section needs to be calculated with the stock prices on the Chinese and U.S. stock markets, and the trading days of the Chinese and U.S. stock markets are not identical, we delete a small amount of data for the noncorresponding trading days of the Chinese and U.S. markets. The final sample includes 644 trading days in total.

To examine the relationship between the discount and expected exchange rate fluctuations, this paper graphs the average discounts of the 10 companies listed in both countries involved in the robustness check and exchange rate fluctuation expectations, showing that the average ADR discount offsets the impact of firm-specific factors to some extent. Figure 4 shows that the discount is always lower than 0, which means that the price of U.S.

TABLE 7.

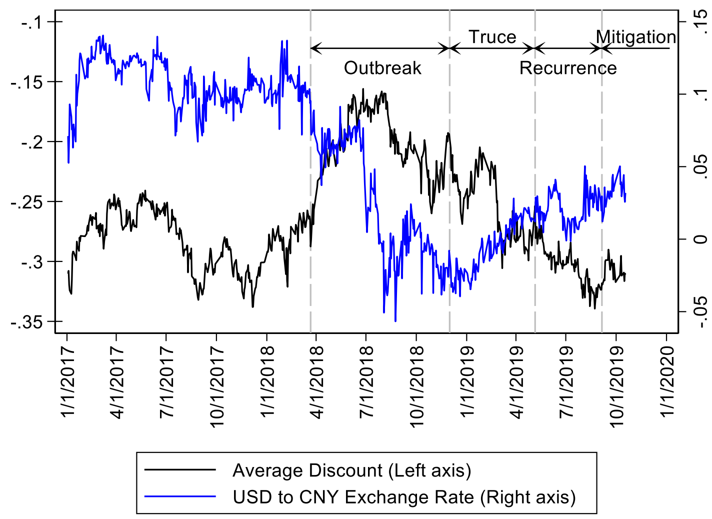
Descriptive Statistics of the Main Variables in the Robustness Check

	Definition	Obs.	Mean	Sd.	Min.	Max.
$\text{discount}_{US\_A_{it}}$	Discount rate (U.S. stocks - Chinese A-shares)	6440	-0.2624	0.2186	-0.5564	0.6941
chn_tpu_t	Standardized U.S. TPU index	34	0.2775	0.2147	0.0000	1.0000
us_tpu_t	Standardized Chinese TPU index	34	0.2128	0.2157	0.0000	1.0000
$forward12M\_spot_t$	Expected exchange rate fluctuations	644	0.0563	0.0525	-0.0567	0.1405
$hs300\_r_t$	Log return of CSI 300 index	644	0.0004	0.0115	-0.0602	0.0578
$sp500\_r_t$	Log return of S&P 500 index	644	0.0004	0.0081	-0.0418	0.0338

stocks is always lower than the transaction price of these stocks in China. From January 2017 to January 2018, the discount in the U.S. market was roughly between −20% and −35%. Between January 2018 and September 2018, exactly when the U.S.—China trade war broke out and intensified, the average discount in the U.S. stock market relative to the price in the A-shares market rose substantially, which means that the same company became “cheap” in the A-shares market in comparison with its stock price in the U.S. stock market; after September 2018, as the trade war evolved, the average discount went through transitory fluctuations several times but was on an overall decline, which means that the stocks on the U.S. market again reached a higher level of discount relative to the price on the A-shares market.

Changes in exchange rate expectations can explain some fluctuations in the discount. As shown in Figure 4, the average discount reversed its rising trend and started to decline steadily in June 2017, and this change was most marked when USD-to-CNY exchange rate expectations decreased sharply. At that time, investors expected USD depreciation against CNY, so local securities had more investment value than securities in the Chinese

FIG. 4. Average Discount (Left Axis) and USD-to-CNY Exchange Rate Expectations (Right Axis) from January 2017 to October 2019



market, leading to a lower discount. However, the exchange rate expectations factor alone cannot reasonably explain the wide differences in the discount at different times and across companies. After the outbreak of the U.S.—China trade war in March 2018, investors expected the USD-to-CNY exchange rate to slump and reach a local minimum around September 2018, meaning that the U.S. dollar would continue to depreciate, whereupon the average discount should have decreased notably; however, Figure 4 shows that average discount did not decrease and even rose instead. Thus, this paper infers the existence of a force in addition to foreign exchange expectations—the trade war—that influenced the valuations of cross-listed stocks.

Table 8 displays the estimates of the influence of trade uncertainty on the discount of companies listed in China and the United States. All the regressions include corporate fixed effects, among which Column (4) corresponds to Model 3, namely, the model of Equation (10). Negative coefficients in the table indicate that the focal independent variables lower the discount, which implies lower valuations of stocks traded on the U.S. stock market than of those traded on the local A-shares market and higher valuations of China A-shares than cross-listed stocks. Columns (2) and (4) add expected exchange rate fluctuations as a control variable, and Columns (3) and (4) add the interaction of the market index return and the TPU index.

TABLE 8.

Analysis of the Influence of the TPU Index on the Discount of Dual-listed Companies

Dependent variable: Discount				
Independent variable	(1)	(2)	(3)	(4)
chn_tpu	0.031	-0.013	0.031	-0.013
	(0.021)	(0.016)	(0.021)	(0.016)
us_tpu	-0.025	-0.051^{***}	-0.025	-0.051^{***}
	(0.019)	(0.014)	(0.019)	(0.014)
hs300_r	-0.267^{**}	-0.28^{**}	-0.199	-0.327^{*}
	(0.084)	(0.086)	(0.133)	(0.157)
sp500_r	0.383^{***}	0.466^{***}	0.391^{***}	0.446^{***}
	(0.091)	(0.077)	(0.107)	(0.097)
forward12M_spot		-0.418^{*}		-0.418^{*}
		(0.192)		(0.193)
chn_tpu_hs			-0.197	0.135
			(0.203)	(0.259)
us_tpu_sp			-0.023	0.065
			(0.182)	(0.191)
Fixed effects	Yes	Yes	Yes	Yes
Observations	6440	6440	6440	6440
R^2	0.009	0.066	0.009	0.066

Note: Standard errors are in parentheses; * denotes significance at the 90% level, ** denotes significance at the 95% level, and *** denotes significance at the 99% level.

We can see from the regression results shown in Columns (2) and (4) of Table 8 that after the exchange rate factor and market factor are controlled for, the discount of stocks listed in both China and the United States is significantly negatively impacted by a higher U.S. TPU index (the estimated coefficient of us_tpu is -0.051); that is, the discount decreases as TPU rises in the United States. This result means that the stock price of the same company on the U.S. stock market is lower than that on the A-shares market, and the degree of influence is approximately 5.1%; in other words, undervaluation of Chinese companies on the U.S. stock market is aggravated. The Chinese TPU index, in turn, does not have a significant influence on the discount.

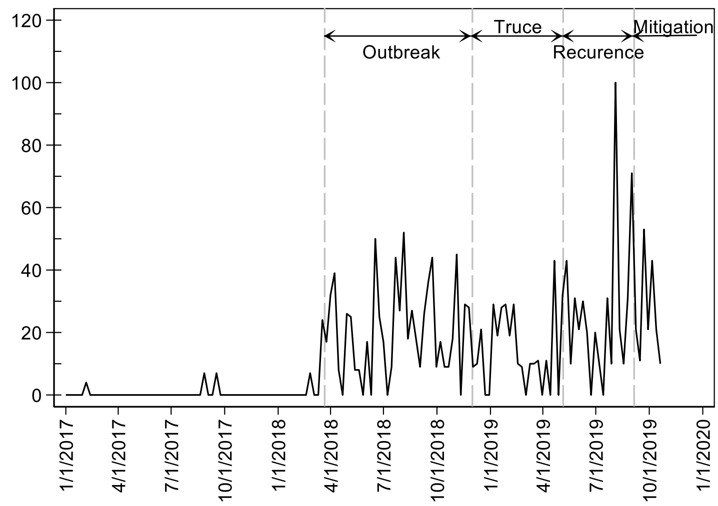
According to the results for hs300_r and sp500_r in Table 8, the stock valuation of companies listed in both China and the United States is significantly influenced by the U.S. stock market index. When the U.S. stock market index rises, the valuation of dual-listed companies on the U.S. stock market is higher than that on the A-shares market, but the discount decreases when the Chinese stock market index surges, and the discount is less influenced by the Chinese stock market index than by the U.S. stock market.

Result 4: After the exchange rate factor and market factors are controlled for, the discount of stocks listed in both China and the United States is significantly negatively impacted by a higher U.S. TPU index.

5.2. Google Trends Index of the U.S.—China Trade War

Given that the TPU indices that we use in Basic Model 1 are not direct proxies of the U.S.—China trade war and capture more events than just the bilateral tensions between China and the United States, we use weekly data from the Google News index, with US China trade war set as the keyword, on the Google Trends website to capture changes in bilateral tensions between the United States and China during the trade war.[11] Figure 5 shows changes in news articles related to the U.S.—China trade war from the Google Trends index.

FIG. 5. Google Trends Index of News Articles on the U.S.—China Trade War from January 2017 to October 2019



[11] The Google Trends index is at weekly frequency. (Link: https://trends.google.com/trends/explore?date=2017-01-01%202019-10-21&gprop=news&q=us%20china%20trade%20war, accessed November 3, 2021.)

Model 4, which is to be estimated in this section, is as shown in Equation (11):

$$\begin{aligned} ccs\_r_{it} &= \alpha_0 + \alpha_1 hs300\_r_t + \alpha_2 sp500\_r_t + \alpha_3 forward12M\_spot_t \\ &+ \beta_1 Google\_Index_t + \gamma_1 Google\_Index_t * hs300\_r_t \\ &+ \gamma_2 Google\_Index_t * sp500\_r_t + A_i + \varepsilon_{it} \end{aligned} \quad (11)$$

The only difference between this model and Model 1 is the independent variable used in Model 1 to capture the impacts of the trade war in the U.S. and Chinese TPU indices. In contrast, this model uses the Google Trends index to capture bilateral tensions during the U.S.—China trade war. Table 9 below reports the descriptive statistical results of the Google index in the regression of Model 4, which have been standardized in the same way as the TPU indices in Equation (4). The descriptive statistics of all the other variables are reported in Table 2.

TABLE 9.

Descriptive Statistics of the Google Trends Index

Variable	Definition	Obs.	Mean	Sd.	Min.	Max.
Google_Index	The Google News Index	147	0.1199	0.166	0	1

Table 10 displays the estimates of the influence of the Google Trends index of coverage of the U.S.—China trade war on the returns of the CCSs. All the regressions include corporate fixed effects, with Column (4) corresponding to Model 4, namely, the model of Equation (11). Columns (2) and (4) add expected exchange rate fluctuations as a control variable, and Columns (3) and (4) add the interaction of the market index return and Google index (Google_hs300 and Google_sp500).

The results in Table 10 confirm that the U.S.—China trade war significantly negatively influenced the returns of CCSs, with the regression coefficients of the Google index in the four models of Table 10 being significantly negative. The significantly positive coefficients of Google_sp500 in Columns (3) and (4) suggest that when the overall U.S. stock market performed better, it could neutralize the negative impact of the trade war on the returns of CCSs to a small degree.

5.3. U.S.—China Bilateral Tariffs

Given that tariffs have been the primary offensive and defensive weapons of choice during the U.S.—China trade war, in this section, we use the

TABLE 10.
Influence of Google Trends Index of News Articles on the U.S.—China Trade War on the Logarithmic Return of CCSs

Dependent variable: ccs_r				
Independent variable	(1)	(2)	(3)	(4)
Google_Index	-0.007^{***}	-0.007^{***}	-0.008^{***}	-0.007^{***}
	(0.002)	(0.001)	(0.002)	(0.001)
hs300_r	0.399^{***}	0.400^{***}	0.406^{***}	0.406^{***}
	(0.035)	(0.035)	(0.036)	(0.036)
sp500_r	1.042^{***}	1.042^{***}	0.939^{***}	0.938^{***}
	(0.07)	(0.071)	(0.072)	(0.073)
forward12M_spot		0.002		0.003
		(0.006)		(0.006)
Google_hs300			-0.088	-0.085
			(0.068)	(0.066)
Google_sp500			0.678^{***}	0.681^{***}
			(0.087)	(0.089)
Fixed effects	Yes	Yes	Yes	Yes
Observations	22995	22995	22995	22995
R^2	0.136	0.136	0.137	0.137

Note: Standard errors are in parentheses; * denotes significance at the 90% level, ** denotes significance at the 95% level, and *** denotes significance at the 99% level.

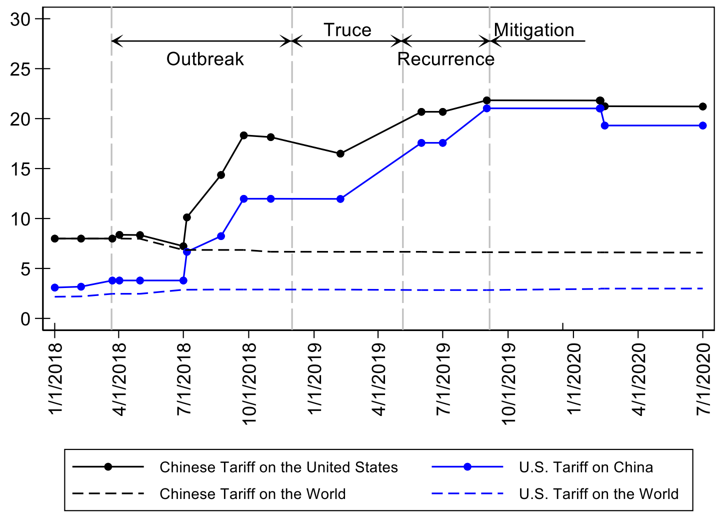
U.S.—China bilateral tariffs from Bown and Kolb (2019) to capture the change in bilateral tensions between the United States and China during the conflict. The trade-weighted average tariffs are computed from product-level tariff and trade data, weighted by U.S. exports and China's exports in 2017. The tariffs that we use in the regression are also standardized to be consistent with the previous analysis of the TPU indices. Figure 6 shows the average tariffs of China and the U.S. on each other and the world before standardization.

Model 5, which is to be estimated in this section, is as shown in Equation (12):

$$\begin{aligned} ccs\_r_{it} &= \alpha_0 + \alpha_1 hs300\_r_t + \alpha_2 sp500\_r_t + \alpha_3 forward12M\_spot_t \\ &+ \beta_1 chn\_Tariff_t + \beta_2 us\_Tariff_t + \gamma_1 chn\_Tariff_t * hs300\_r_t \\ &+ \gamma_2 us\_Tariff_t * sp500\_r_t + A_i + \varepsilon_{it} \end{aligned} \tag{12}$$

In this model, we use the standardized average Chinese tariff on the United States, denoted as chn_Tariff in the above equation, and the stan-

FIG. 6. Average Tariffs of China and the U.S. on Each Other and the World



dardized average U.S. tariff on China, denoted as us_Tariff, to replace the Chinese and U.S. TPU indices in Basic Model 1. Because the available tariff data are from January 1, 2018, the sample period in the regression in this section runs from January 1, 2018, to October 18, 2019.

Table 11 displays the estimates of the influence of U.S.—China bilateral tariffs on the returns of the CCSs. All the regressions include corporate fixed effects, among which Column (4) corresponds to Model 5, namely, the model of Equation (12). Columns (2) and (4) add expected exchange rate fluctuations as a control variable, and Columns (3) and (4) add the interaction of the standardized average Chinese and U.S. tariffs and the returns of the market index of the corresponding country.

The results in Table 11 suggest that when the United States imposed a high tariff on China, the returns of CCSs were negatively influenced; when China retaliated with a higher tariff on the United States, the returns of CCSs increased. The significantly positive coefficients of us_Tariff∗sp500 in Columns (3) and (4) suggest that when the overall U.S. stock market performed better, it could neutralize the trade war's negative impact on the returns of CCSs to a small degree.

TABLE 11.

Influence of U.S.—China Bilateral Tariffs on the Logarithmic Return of CCSs

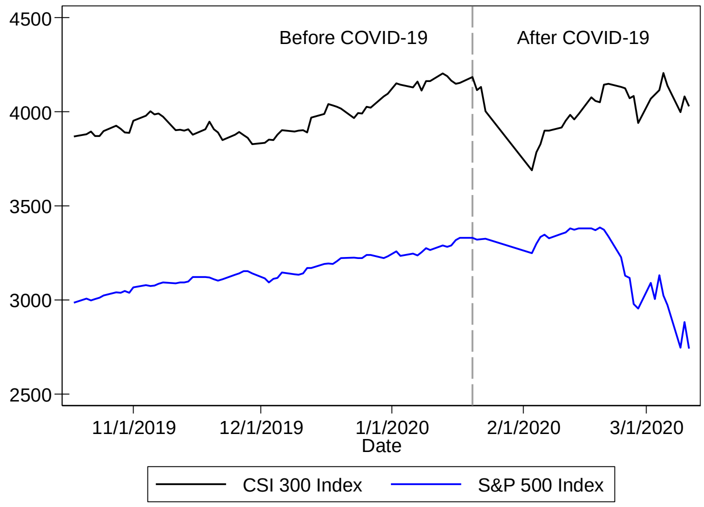
Dependent variable: ccs_r				
Independent variable	(1)	(2)	(3)	(4)
chn_Tariff	0.009^{***}	0.014^{***}	0.01^{***}	0.014^{***}
	(0.003)	(0.003)	(0.003)	(0.003)
us_Tariff	-0.012^{***}	-0.016^{***}	-0.013^{***}	-0.016^{***}
	(0.003)	(0.003)	(0.003)	(0.003)
hs300_r	0.414^{***}	0.415^{***}	0.429^{***}	0.431^{***}
	(0.035)	(0.035)	(0.048)	(0.048)
sp500_r	1.035^{***}	1.039^{***}	0.911^{***}	0.916^{***}
	(0.076)	(0.076)	(0.08)	(0.079)
forward12M_spot		0.019^{**}		0.018^{**}
		(0.009)		(0.009)
chn_Tariff∗hs300			−0.032	−0.035
			(0.058)	(0.058)
us_Tariff∗sp500			0.314^{***}	0.309^{***}
			(0.066)	(0.065)
Fixed effects	Yes	Yes	Yes	Yes
Observations	14700	14700	14700	14700
R^2	0.183	0.183	0.184	0.184

Note: Standard errors are in parentheses; * denotes significance at the 90% level, ** denotes significance at the 95% level, and *** denotes significance at the 99% level.

6. PLACEBO TEST: THE COVID-19 PANDEMIC

The COVID-19 pandemic, which broke out at the end of 2019, is a global pandemic triggered by the novel coronavirus (COVID-19). COVID-19 was first found in Wuhan, Hubei Province, China, in December 2019. Initially, the outbreak of the COVID-19 pandemic unexpectedly hit the domestic economy of China. Since the COVID-19 pandemic brought extreme uncertainty in terms of the infectivity, prevalence rate and fatality of the virus, the availability of antigen and antibody tests, the coping capacity of the health care system, the short-term economic impact of the pandemic, policy measures, and so forth, the outbreak of the pandemic brought substantial fluctuations to the domestic stock market, bond market, foreign exchange market, and commodity market. Figure 7 shows the trends of the Chinese and U.S. stock market indices from October 2019 to March 2021. It shows that after it was announced on January 20, 2020, that COVID-19 could spread through human-to-human contact, the Chinese stock market index plummeted, but the U.S. stock market was not significantly affected. In the face of uncertainties like the unknown spread of a new virus, investors are prone to pessimism and panic, thus influencing the valuations of related stocks.

FIG. 7. Changes in the Closing Price of the Chinese and U.S. Stock Market Indices from October 2019 to March 2021



In the following placebo test, we choose the date of January 20, 2020, when Zhong Nanshan announced the possibility of human-to-human transmission of the novel coronavirus, as a dummy variable, and the domestic COVID-19 epidemic as the shock event and placebo. Then, we analyze the impact of the outbreak of the domestic epidemic on CCSs according to Basic Model 2. Before the pandemic was declared a public health emergency of international concern on March 11, 2020, and its economic impact was still concentrated on China, the domestic stock market valuations and economy were hit hard and in a downturn under pressure. At this stage, China—U.S. trade policies and the trading environment did not undergo any significant changes. Thus, we can take January 20, 2020, as a pseudostage of the U.S.—China trade war to examine whether the valuations of CCSs (daily returns) decline when the domestic economy is in a downturn but the trade policies of the two countries remain constant.

In this part of the study, we select the top 35 Chinese companies listed in the United States in terms of market capitalization as the regression sample, as shown in Appendix 2. Since Guangshen Railway Co., Ltd. (NYSE: GSH. N) delisted from the U.S. stock market in August 2020 and its related data are missing, the analysis in this part includes only the remaining 34 companies. The World Health Organization announced that the COVID-19 pandemic was a public health emergency of international concern on March 11, 2020, indicating that the impact of the pandemic was no longer concentrated in the territory of China, and so the sample period in this section runs from October 18, 2019, to March 11, 2020.

What needs to be emphasized is that before and since the COVID-19 outbreak, the U.S.—China trade war situation has not changed significantly. The evidence supporting this argument is as follows. First, according to Bown and Kolb (2019), from October 18, 2019, to March 11, 2020, Chinese tariffs on the United States and U.S. tariffs on China were stable during this period.[12] Second, the Google index[13] of news articles on the U.S.—China trade war from the Google Trends website shows that during the 93 trading days considered in this section, the index values are larger than zero on only 16 days. Specifically, before the outbreak of COVID-19, the Google index values were zero on 50 out of 63 days (79.37%); after the COVID-19 outbreak, on 27 out of 30 days (90.00%), the Google index values were zero. In contrast, from March 22, 2018, to October 18, 2019, only 13.25% of the Google index values were zero. Therefore, the U.S.—China trade war situation was relatively stable before and after the COVID-19 outbreak.

Table 12 reports the descriptive statistical results of variables for the 34 sample companies in this paper. The dependent variable is the daily logarithmic return of CCSs listed in the United States, and the explanatory variable COVID-19 is the dummy variable representing the event of the announcement of Wuhan as an affected area, which equals 1 after January 20, 2020, and 0 otherwise. The estimation in this section adds indices that represent the situation of Chinese and U.S. stock markets: the logarithmic return of the CSI 300 and S&P 500 indices and the variable forward12M_spot, denoting expected exchange rate fluctuations. These data are all daily data from the WIND database.

[12] The Chinese tariff on the United States experienced two changes. First, it decreased from 21.83% to 21.81% on January 1, 2020. Second, it declined from 21.81% to 21.24% on February 14, 2020. The U.S. tariff on China experienced three changes. First, it decreased from 21.03% to 21.02% on February 7, 2020. Second, it increased from 21.02% to 21.04% on February 8, 2020. Third, it decreased from 21.04% to 19.31% on February 14, 2020.

[13] Based on the short-term period that we set, we downloaded daily data from the Google Trends index. (Link: https://trends.google.com/trends/explore?date=2019-10-18%202020-03-11&gprop=news&q=us%20china%20trade%20war, accessed November 16, 2021.)

TABLE 12.

Descriptive Statistics of the Main Variables in the Placebo Test

	Definition	Obs.	Mean	Sd.	Min.	Max.
ccs_r	Log return of CCSs	3162	−0.0040	0.0256	−0.2076	0.3150
forward12M_spot	Expected exchange rate fluctuations	93	0.0486	0.0141	0.0230	0.1009
hs300_r	Log return of CSI 300 index	93	0.0000	0.0142	−0.0821	0.0324
sp500_r	Log return of S&P 500 index	93	0.0006	0.0158	−0.0790	0.0482

In the placebo test below, this paper focuses on the influence of the trade war on the valuations of CCSs with market performance and expected exchange rate fluctuations at the early stage of the COVID-19 pandemic controlled for. This paper uses Model 6, namely, Equation (13), to estimate the logarithmic return of CCSs:

$$\begin{aligned} ccs\_r_{i,t} &= \alpha_0 + \alpha_1 hs300\_r_t + \alpha_2 sp500\_r_t + \alpha_3 forward12M\_spot_t \\ &+ \beta_0 covid19_t + \gamma_1 hs300\_r_t * covid19_t \\ &+ \gamma_2 sp500\_r_t * covid19_t + \varepsilon_{it} \end{aligned} \tag{13}$$

In model estimation, we also pay attention to changes in the effects on stock returns before and after the event represented by the dummy variable COVID-19. Table 13 reports on the estimates of Model 6. Column (1) controls for only market performance, Columns (2) and (3) control for the influence of expected exchange rate fluctuations, and Column (3) adds the interaction of the dummy variable representing the outbreak of the COVID-19 pandemic and market performance. The results in Table 13 show that at the early stage of the COVID-19 pandemic, the event of Wuhan becoming an affected area did not significantly influence the returns of CCSs listed in the United States, and the coefficient of the dummy variable is no longer significant at −0.002 after factors such as market performance and expected exchange rate fluctuations are controlled for. Furthermore, this suggests that when a negative shock affects only the domestic market and not bilateral markets, the returns of CCSs are not significantly affected.

TABLE 13.
Analysis of the Influence of the COVID-19 Pandemic on the Logarithmic Return of CCSs

Dependent variable: ccs_r			
Independent variable	(1)	(2)	(3)
covid19	-0.002^{***}	-0.002^{***}	0.000
	(0.001)	(0.001)	(0.001)
hs300_r	0.169^{***}	0.171^{***}	0.546^{***}
	(0.028)	(0.028)	(0.047)
sp500_r	0.615^{***}	0.612^{***}	1.503^{***}
	(0.046)	(0.045)	(0.123)
forward12M_spot		-0.022	-0.034
		(0.026)	(0.026)
covid19∗hs300			-0.477^{***}
			(0.057)
covid19∗sp500			-0.920^{***}
			(0.107)
Fixed effects	Yes	Yes	Yes
Observations	3162	3162	3162
R^2	0.186	0.187	0.218

Note: Standard errors are in parentheses; * denotes significance at the 90% level, ** denotes significance at the 95% level, and *** denotes significance at the 99% level.

Result 5: After the exchange rate factor and market factors are controlled for, the daily returns of CCSs do not show a downward trend due to the impact of COVID-19.

7. CONCLUSION

As the trade links between countries worldwide and the integration of financial markets deepen, comovement of stock markets in different countries gradually increases. Therefore, if major economies such as China and the United States have frictions and even disputes in trade and other spheres of bilateral relations, these are likely to affect the economic growth of the whole world and the process of globalization and influence the performance of financial markets. The U.S.—China trade war is a significant economic event occurring in the last two years. It has had an evident impact on China and the United States and a considerable influence on the performance of CCSs on the U.S. stock market. This exogenous shock allows us to further study the factors that influence the valuation and pricing of stocks listed in the two countries and their connections with the markets.

On the one hand, this paper empirically evaluates the influence of TPU; on the other hand, it provides related companies listed in the United States with insights into possible negative effects against the backdrop of fragilely stable U.S.—China relations.

This paper shows that uncertainty in U.S.—China relations significantly negatively impacts the valuation of CCSs. For the time being, the outbreak of the trade war has aggravated this uncertainty. Coupled with the global impact of the COVID-19 pandemic and the concurrent international situation, U.S.—China relations have become complicated, and CCSs may be continuously impacted by risks in overseas markets in the future. In addition, exploring the impacts of international investor sentiment on asset prices is a topic for further research.

APPENDIX

A.1. THE TIMELINE OF THE U.S.-CHINA TRADE WAR (2018-2019)

Stage	Date	Event
outbreak	2018/3/22	Trump asked the United States trade representative (USTR) to investigate applying tariffs on US$50–60 billion worth of Chinese goods. He relied on Section 301 of the Trade Act of 1974 for doing so, stating that the proposed tariffs were "a response to the unfair trade practices of China over the years", including theft of U.S. intellectual property. Over 1,300 categories of Chinese imports were listed for tariffs, including aircraft parts, batteries, flat-panel televisions, medical devices, satellites, and various weapons.
	2018/4/2	Ministry of Commerce of China responded by imposing a 15%-25% tariff on 128 products imported from America.
	2018/4/3	The U.S. Trade Representative's office published an initial list of 1,300+ Chinese goods to impose levies upon, including products like flat-screen televisions, weapons, satellites, medical devices, aircraft parts and batteries. Chinese Ambassador Cui Tiankai responded by warning the U.S. that they may fight back
	2018/4/4	Chinese Customs Tariff Commission of the State Council decided to announce a plan of additional tariffs of 25% on 106 items of products.

Stage	Date	Event
outbreak	2018/5/14	The U.S. Commerce Department announced the preliminary results of an anti-dumping investigation into forged steel fluid end blocks from China, ruling that Chinese companies dumped up to 142.72% of the U.S. and that the value of Chinese products exported to the U.S. was about $78.4 million.
	2018/5/15	Vice Premier and Politburo member Liu He, top economic adviser to president of China and General Secretary Xi Jinping, visited Washington for further trade talks.
	2018/6/15	Trump declared that the United States would impose a 25% tariff on $50 billion of Chinese exports. $34 billion would start July 6, 2018, with a further $16 billion to begin at a later date. China's Commerce Ministry accused the United States of launching a trade war and said China would respond in kind with similar tariffs for the U.S. imports, starting on July 6. Three days later, the White House declared that the United States would impose additional 10% tariffs on another $200 billion worth of Chinese imports if China retaliated against these U.S. tariffs. The list of products included in this round of tariffs was released on July 11, 2018, and was set to be implemented within 60 days.
	2018/7/6	American tariffs on $34 billion of Chinese goods came into effect. China imposed retaliatory tariffs on the U.S. goods of a similar value. The tariffs accounted for 0.1% of the global gross domestic product.
	2018/7/10	U.S. released an initial list of the additional $200 billion of Chinese goods that would be subject to a 10% tariff. Two days later, China vowed to retaliate with additional tariffs on American goods worth $60 billion annually.
	2018/8/8	The Office of the United States Trade Representative published its finalized list of 279 Chinese goods, worth $16 billion, to be subject to a 25% tariff from August 23. In response, China imposed 25% tariffs on $16 billion of imports from the United States, which was implemented in parallel with the U.S. tariffs on August 23.
	2018/8/23	The U.S. and Chinese promised tariffs on $16 billion of goods took effect, and on August 27, 2018, China filed a new WTO complaint against the United States regarding the additional tariffs.
	2018/9/17	The United States announced its 10% tariff on $200 billion worth of Chinese goods would begin on September 24, 2018, increasing to 25% by the end of the year. They also threatened tariffs on an additional $267 billion worth of imports if China retaliates, which China promptly did on September 18 with 10% tariffs on $60 billion of the U.S. imports. So far, China has either imposed or proposed tariffs on $110 billion of U.S. goods, representing most of its imports of American products.

Stage	Date	Event
truce	2018/12/1	The planned increases in tariffs were postponed. The White House stated that both parties will "immediately begin negotiations on structural changes with respect to forced technology transfer, intellectual property protection, non-tariff barriers, cyber intrusions and cyber theft." According to the Trump Administration, "If at the end of 90 days, the parties are unable to reach an agreement, the 10 percent tariffs will be raised to 25 percent." The U.S. trade representative's office confirmed the hard deadline for China's structural changes is March 1, 2019.
recurrence	2019/5/6	Trump stated that the previous tariffs of 10% levied in $200 billion worth of Chinese goods would be raised to 25% on May 10. With notification by USTR, the Federal Register on May 9 published the modification of duty on or after 12:01 a.m. Eastern Time Zone May 10 to 25% for the products of China covered by the September 2018 action. The stated reason being that China reneged upon already agreed upon deals.
	2019/5/15	Trump signed executive order 13873, placing Huawei on the Department of Commerce's Entity List. According to Reuters, the move banned Huawei from buying vital parts and components from U.S. companies without special approval and effectively barred its equipment from U.S. telecom networks on national security grounds. And China will raise tariffs on $60 billion worth of the U.S. goods from June 1, 2019.
	2019/6/29	During the G20 Osaka summit, Trump announces he and Xi Jinping agreed to a "truce" in the trade war after extensive talks. Prior tariffs are to remain in effect, but no future tariffs are to be enacted "for the time being" amid restarted negotiations. Additionally, Trump said he would allow American companies to sell their products to Huawei, but the company would remain on the U.S. Entity List. However, the extent of how much this plan to temporarily exempt Huawei from previous bans would be implemented later became unclear and, in the weeks later, there was no clear indication of the reversal of Huawei bans.
	2019/8/1	Trump announced on Twitter that additional 10% tariff will be levied on the "remaining $300 billion of goods".
	2019/8/5	China ordered state-owned enterprises to stop buying the U.S. agricultural products in retaliation to Trump's August 1 tariff announcement. Zippy Duvall, president of the American Farm Bureau Federation, called the move "a body blow to thousands of farmers and ranchers who are already struggling to get by," adding, "Farm Bureau economists tell the United States exports to China were down by $1.3 billion during the first half of the year. Now, we stand to lose all of what was a $9.1 billion market in 2018, which was down sharply from the $19.5 billion U.S. farmers exported to China in 2017."

Stage	Date	Event
recurrence	2019/8/13	Trump delayed some of the tariffs. $112 billion worth will still take place on September 1 (which means that on September 1, $362 billion total worth, including the newly imposed $112 billion, of Chinese products will face a tariff), but the additional, not yet imposed, $160 billion will not take effect until December 15.
	2019/8/23	Chinese Ministry of Finance announced new rounds of retaliative tariffs on $75 billion worth of U.S. goods, effective beginning September 1. Trump tweeted that he "hereby ordered" American companies to "immediately start looking for an alternative to China". According to an article in The New York Times, Trump's aides said that no order had been drawn up nor was it clear one would be. In a tweet on the following day, Trump said that he had the authority to make good on his threat, citing the International Emergency Economic Powers Act of 1977. Furthermore, tariffs are to be raised from 25% to 30% on the existing $250 billion worth of Chinese goods beginning on October 1, 2019, and from 10% to 15% on the remaining $300 billion worth of goods beginning on December 15, 2019.
mitigation	2019/9/5	The Office of the U.S. Trade Representative and Chinese state media confirmed that deputy-level meetings in mid-September would lead to ministerial-level talks in coming weeks.
	2019/9/11	After China announced it was exempting 16 American product types from tariffs for one year, Trump announced he would delay until October 15, a tariff increase on Chinese goods previously scheduled for October 1. Trump asserted he granted the delay at the request of Chinese vice premier Liu He.
	2019/10/11	Trump announced that the United States and China had reached a tentative agreement for the "first phase" of a trade deal, with China agreeing to buy up to $50 billion in American farm products, and to accept more American financial services in their market, with the United States agreeing to suspend new tariffs scheduled for October 15. The deal was expected to be finalized in coming weeks.

Source: An introduction to China-the United States Trade War on Wiki website. https://en.wikipedia.org/wiki/China%E2%80%93United_States_trade_war and https://zh.wikipedia.org/wiki/%E4%B8%AD%E7%BE%8E%E8%B4%B8%E6%98%93%E6%88%98

A.2. BASIC INFORMATION ON THE 35 CHINESE COMPANIES LISTED IN THE UNITED STATES

Arranged according to the total market capitalization from high to low, the company's basic situation data is selected on October 18, 2019.

Securities Code	Total Market capitalization (Million Dollars)	Total equity (Million Units)	Listing date
BABA.N	440,335.32	20,828.25	2014/9/19
CHL.N	172,239.76	20,475.48	1997/10/22
PTR.N	93,944.67	183,020.98	2000/4/6
SNP.L	90,803.41	121,071.21	2000/10/18
LFC.N	67,722.23	28,264.71	2003/12/17
CEO.N	66,997.97	44,647.46	2001/2/27
JD.O	43,702.62	2,920.32	2014/5/22
CHA.N	37,261.26	80,932.37	2002/11/14
NTES.O	36,600.60	3,199.02	2000/6/30
BIDU.O	35,945.78	34.6499	2005/8/5
CHU.N	32,342.22	30,598.12	2000/6/21
TAL.N	23,056.41	197.2459	2010/10/20
EDU.N	17,966.45	157.8497	2006/9/7
TCOM.O	17,287.71	73.5522	2003/12/9
WB.O	10,700.41	225.035	2014/4/17
HTHT.O	10,451.17	294.3161	2010/3/26
ATHM.N	9,820.01	118.3847	2013/12/11
MLCO.O	9,331.79	1,379.76	2006/12/19
CEA.N	8,166.82	16,379.51	1997/2/4
BGNE.O	7,982.71	784.512	2016/2/3
WUBA.N	7,621.48	299.0573	2013/10/31
ZNH.N	7,566.39	12,267.17	1997/7/30
HNP.N	7,197.58	15,698.09	1994/10/5
MOMO.O	6,890.93	416.7482	2014/12/11
VIPS.N	6,308.66	133.7997	2012/3/23
ACH.N	5,317.88	17,022.67	2001/12/11
JOBS.O	5,079.47	66.4156	2004/9/29
YY.O	4,651.86	1,614.39	2012/11/21
CBPO.O	4,420.23	38.2638	2009/12/2
SHI.N	3,070.72	10,823.81	1993/7/26
SINA.O	2,761.25	69.5529	2000/4/13
BZUN.O	2,559.33	187.2677	2015/5/21
HCM.O	2,549.30	666.6575	2016/3/17

Securities Code	Total Market capitalization (Million Dollars)	Total equity (Million Units)	Listing date
SSW.N	2,387.24	215.6492	2005/8/9
GSH.N	2,205.81	7,083.54	1996/5/14

A.3. BASIC INFORMATION ON 10 COMPANIES LISTED ON BOTH THE A-SHARES MARKET AND THE U.S. STOCK MARKET

Securities Code in China	Securities Code in U.S.	Listing Date in China	Listing Date in U.S.	Total Market capitalization (Million Dollars)	Total equity (Million Units)
601857.SH	PTR.N	2007/11/5	2000/4/6	93,944.67	183,020.98
600028.SH	SNP.N	2001/8/8	2000/10/18	70,862.98	121,071.21
601628.SH	LFC.N	2007/1/9	2003/12/17	67,722.23	28,264.71
600050.SH	CHU.N	2002/10/9	2000/6/21	32,342.22	30,598.12
600115.SH	CEA.N	1997/11/5	1997/2/4	8,166.82	16,379.51
600029.SH	ZNH.N	2003/7/25	1997/7/30	7,566.39	12,267.17
600011.SH	HNP.N	2001/12/6	1994/10/5	7,197.58	15,698.09
601600.SH	ACH.N	2007/4/30	2001/12/11	5,317.88	17,022.67
600688.SH	SHI.N	1993/11/8	1993/7/26	3,070.72	10,823.81
601333.SH	GSH.N	2006/12/22	1996/5/14	2,205.81	7,083.54

A.4. TERMS SETS FOR ECONOMIC/TRADE POLICY UNCERTAINTY IN CHINA (DAVIS ET AL., 2019)

Category	English Terms	In Chinese Characters
Uncertainty	uncertain/uncertainty/not certain/unsure/not sure/hard to tell/unpredictable/unknown	不确定/不明确/不明朗/未明/难料/难以预计/难以估计/难以预测/难以预料/未知
Economics	economy/business	经济/商业
Policy	fiscal/monetary/ China Securities Regulatory Commission/ China Banking Regulatory Commission/ Ministry of Finance/ The People's Bank of China/National Development and Reform Commission /Opening-up/Reform/Ministry of Commerce/legislation/tax/national bonds/government debt/central bank/ Ministry of Commerce/tariff/governmental deficit	财政/货币/证监会/银监会/财政部/人民银行/国家发改委/开放/改革/商务部/法律/税收/国债/政府债务/央行/外经贸部/关税/政府赤字
Trade Policy	import tariffs/ import duty/ import barrier/ WTO/world trade organization/ trade treaty/ trade agreement/ trade policy/ trade act/Doha round/Uruguay round/ GATT/General Agreement on Tariffs and Trade/ dumping/protectionism/trade barrier/export subsidies	进口关税/进口税/进口壁垒/WTO/世界贸易组织/世贸组织/贸易条约/贸易协定/贸易政策/贸易法/多哈回合/乌拉圭回合/GATT/关贸总协定/倾销/保护主义/贸易壁垒/出口补贴

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