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Centre for Economic Policy Research
33 Great Sutton Street, London EC1V 0DX, UK
Tel: +44 (0)20 7183 8801
www.cepr.org

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Abstract

At the beginning of 2018, President Trump started taking protective tariff measures against products from China in a sequence of events which started a “trade war” between the United States (U.S.) and China. As the value of trade flows affected on both sides rose to a significant amount, this episode will become an interesting research object in the future. A thorough analysis of many outcomes of interest is at this point in time -- and even will be in the next few years -- impossible due to a lack of data which will only become available at a later point. However, as is customary with historical preferential liberalizations in trade agreements and potentially the opposite of it through Brexit, it is possible to gauge consequences of this “trade war” or “trade dispute” when focusing on the stocks of listed companies around related tariff-change announcements or implementations by the U.S. and China in the relevant time span. This paper proposes such an analysis and finds, very much consistent with the rumors from business, that the associated protectionist tariffs appear to have done to a large extent the opposite of what was intended: they hurt domestic firms in targeted and also other, untargeted sectors of an acting country, and they affect third countries and territories which are not even party to the “trade war” or “dispute”.

JEL Classification: F15, F23, G14

Keywords: U.S.-China “trade war”, event study, Stock market

Peter Egger - egger@kof.ethz.ch
ETH Zurich and CEPR

Jiaqing Zhu - zhujiaqing@gdufs.edu.cn
Guangdong University of Foreign Studies

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The U.S.-Chinese Trade War: An Event Study of Stock-Market Responses

Peter H. Egger
ETH Zurich, CEPR, and CESifo

Jiaqing Zhu
Guangdong University of Foreign Studies
Southern China Institute of Fortune Management Research

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1. Introduction

The customary academic economic approach towards (optimal) trade policy and tariff setting assumes that the citizens of a country are more or less homogeneous, well informed about the consequences of the workings of their and other economies, and that they as well as the politicians and policy makers representing them behave in a rational way which puts the maximization of economic well-being of representative individuals to the fore (see Francois, Nelson, and Rojas-Ramagosa, 2019, for an overview). If this were the case in reality, we would not have observed many of the shocks to the multilateral system in the recent years – ranging from the Brexit referendum to the so-called "trade war" between the United States and China since 2018. It appears that the constituencies of the leading political powers in charge in many countries are ill-informed or do not care about the economic consequences of some of the quite drastic policy changes in the recent past. Economists have overwhelmingly advised against risking the – in aggregate terms, with admittance of heterogeneous distributional consequences of – economic benefits of the modern world trade system with its extensive access to global markets, at least in goods through low tariffs. The electorates and constituencies in many countries rather supported politicians who advertised anti-globalization movements, ignoring the advice of economists.

When trusting early releases of statistical data from all over the world, considering the downward revisions of global business cycle forecasts, and listening to business leaders, the "trade war" between the United States and China is taking a toll everywhere.[1] However, it will take years to digest the quantitative impact of that very "trade war" (as well as of Brexit) on the basis of profound statistical data, as at least revised releases of trade, sales, employment, and other data for all economies involved (the United States, China, but also third parties to the "trade war") are not available simultaneously to the trade war.[2] At this point, apart from interviews, surveys, in the future to be revised preliminary data and some scarce data of sufficient quality which had been analyzed by a handful of economists at this point (see Amiti, Redding and Weinstein, 2019; and Fajgelbaum, Goldberg, Kennedy, and Khandelwal, 2019; who had apparently worked on the U.S.-China "trade war" parallel to us), stock-market data are almost the only measurable market data we can study to see early, hard signals about how investors – across countries (territories) and sectors, depending on the exposure to the projected and implemented tariff changes – responded to the "trade war" in terms of expectations.

This is what we propose in this paper in the absence of any other trustworthy cross-country data to consult at this point in time. We exploit the variation of stock-market prices in their deviation from "normal market value" for each listed firm in a market and sector around the sequence of events

[1] The experience of Brexit is quite similar in that regard. We saw a serious depreciation of the British Pound since the Brexit Referendum, we saw bad early signals at stock markets (see Davies and Studnicka, 2018), we saw the flight of some businesses away from Britain, and we hear at least about delays – if not complete withdrawals – of investment plans by industry.

[2] For instance, the most recent trade dataset released by Chinese Customs dates back to 2016. However, as an outcome of the "trade war", the detail at and degree to which even data for 2016 are available, is limited relative to earlier years. As of the beginning of 2019, firm-level accounting data and similarly detailed trade data are only available up until 2016. If data will be released at the earlier pace in the future, this means that we will have to wait at least until 2022 or 2023 to do a solid analysis of the "trade-war" effects at least for China.

which marks the evolution of the U.S.-China "trade dispute" or "war" since 2018. We do so for all active firms which are listed in the local stock exchanges for 40 economies – either in one of the directly involved countries, the United States and China, or in any other one of 38 economies covered by the World Input Output Database (WIOD; this database covers 27 members of the European Union except Croatia, the three members of the North American Free Trade Agreement, and nine other countries and territories beyond China).

What we distill from this analysis at this point are two observations. First, the actions by the United States and China hurt stock prices on average not only in the targeted country but also at home, and this is the more so the case, the higher the trade-war tariff margins were set. Second, the actions of both the United States and China indirectly affect stock prices through global value-chain linkages in the United States, China, and in third economies, which do not directly participate in the "trade war". However, these indirect (positive or negative) effects are present the more so, the more an economy's output is "linked" to output of the United States and China.

To the best of our knowledge, these results are novel, and they resound well with what we see in interviews and the media: the "trade war" is bad for many players, including ones in the United States and China. Clearly, at this point what we see in the data cannot tell us about long-term economic reactions of fundamental variables such as real investment, employment, profits, and the values of assets (including housing). However, there is a chance that these economic aggregates will be affected in the long run, and this is more likely, the longer the uncertainty and the real costs induced by the setting of "trade-dispute" or "trade-war" tariffs last.

The remainder of the paper is organized as follows. The next section will provide a brief outline of antecedent work which tried to learn responses to international economic policy setting (announcements versus implementations) and raise some hypotheses. In Section 3, we present the chronology of the U.S.-China "trade war". In Section 4, we outline the research design. Section 5 describes the data and their sources. Section 6 contains a discussion of the main empirical results. Section 7 is devoted to several extensions. The last section concludes with a brief summary.

2. Immediate/Short-term Responses to Announcements and Implementations of International Economic Policy Measures

2.1 Related Literature – Responses to Trade Policy

There is one strand of work which is particularly closely related to ours, and this strand has two lines of interest: one is estimating the effects of announcements of preferential-trade-agreement (PTA) negotiations and eventual participations, and the other one is about exiting PTAs, both on stock-market returns of listed firms. The reason for why this literature focuses on the stock market is that the exact timing of trade-agreement events does not coincide with the end of a calendar year, and stock-market data, due to their availability at a daily level permit identifying immediate responses at least of stock-market valuations relatively precisely at times of announced or implemented policy changes. The latter helps avoiding the misattributions of economic effects to policy changes due to time-aggregation bias (e.g., when economic changes occur actually prior to

policy changes or their announcements within a calendar year) and reducing the influence of confounding factors.

Examples of work trying to quantify stock-market responses to PTA-membership announcement events are the ones by Thompson (1993, 1994), Rodriguez (2003), Breinlich (2014), and Moser and Rose (2014). What these papers tend to find is that announcements of trade liberalizations by way of PTA membership led to responses in expectations as captured by stock-market valuations

Breinlich, Leromain, Novy, Sampson, and Usman (2018) and Davies and Studnicka (2018) use the idea of considering stock-market reactions to the Brexit vote. Both studies find quite sizable (negative) average effects, and the corresponding responses are quite heterogeneous among firms in a way that is consistent with partial and general equilibrium repercussions.

However, a fundamental difference between this earlier work and ours is that it did/could not make use of any information regarding the expected magnitude of changes, as, at least for larger cross sections of countries (and PTAs) in years much before the mid-1990s, detailed information on product- and sector-specific tariffs is not easily accessible.

2.2 Early Signals on Economic Responses to the U.S.-China "Trade War"

In a post entitled "Trump's Trade War Timeline: An Up-to-date Guide" published on December 1 2018, Chad P. Bown and Melina Kolb from the Peterson Institute for International Economics, a leading economic think-tank in the United States, put the U.S.-China "trade dispute" in the bigger context of the Trump administration's agenda to "bring home" business activity to the United States, where the practice had become, in the view of the president, to run production facilities abroad (e.g. China, the European Union, or Mexico) to serve U.S. customers. How successful this agenda will be in the long run – when the parties involved and countries targeted might call on retaliatory measures to limit a reverse service of their customers by foreign-based U.S. companies or the ownership of assets in their jurisdictions by U.S. companies or citizens – will have to be seen. After all, and in contrast to the Reagan administration when similar measures had – more or less successfully – been taken against Japan, the party against which the actions by the United States are targeted is not a single one, China, but they include a host of countries which a few years ago other presidencies of all colors in the United States would have called allies (see the aforementioned post). In any case, almost everything related to consequences is speculation right now,[3] and this is

[3] However, Bown (2018, p.17) delineates a few general insights into the nature of tariffs on China and suspected effects in saying that "[…] the Trump administration is imposing higher tariffs on two kinds of products—intermediate inputs and consumer goods. In general, tariffs impose costs on consumers of such products—higher prices, lower volume, reduced access to foreign varieties—that outweigh the limited gains to local producers who face less import competition. Bown (2018) distinguishes three types of costs of the Trump administration's trade actions against China: (i) increased final-goods prices to consumers and intermediate-goods prices to producers in the United States, (ii) damages to successful U.S. exporters to China through retaliatory measures taken by China, and (iii) wider disruptions of the political environment due to the administration's undermining of the rules and workings of multilateral cooperation under the auspices of the World Trade Organization (WTO). Regarding damages (increases) to the prices of consumer goods, see the post for c|net from November 28 entitled "Your next iPhone might cost more because of US-China trade war" by Shara Tibken; the post entitled "How A U.S.-China Trade War Might Raise Apple and Huawei Smartphone Prices" by Ralph Jennings for Forbes from April 12, 2018 points in the same direction.

even more so the case with the long run,[4] which is why we limit our interests on what is accurately measurable at this point, namely stock-market prices.

What the present article seeks to accomplish is to deliver a systematic evidence based on two ingredients: (i) an exhaustive use of stock-market data for the United States, China and third countries and territories, which defies the eclectic approach; (ii) and the use of systematic variation of tariffs across sectors and firms, which helps avoiding a misattribution of general business cycle changes to the U.S.-China tariff announcement and implementation events.[5]

Two academic papers mentioned in the introduction, namely the one by Amiti, Redding, and Weinstein (2019) as well as the one by Fajgelbaum, Goldberg, Kennedy, and Khandelwal (2019) address effects of the U.S.-China "trade war" mainly on U.S. economic outcomes. Amiti, Redding, and Weinstein (2019) document that the terms of trade of the U.S. have not improved and consumer prices have risen on average so that U.S. consumers bear a cost of the U.S.-China "trade war". Fajgelbaum, Goldberg, Kennedy, and Khandelwal (2019) demonstrate that even the county constituencies with a strong Republican majority counties were most negatively affected by the "trade war".

2.3 Some Hypotheses

"Trade-war" tariffs may be simply interpreted as one form of protectionism. Economic textbooks rely on stylized models when discussing protectionism. In particular, they assume that products produced by a country and ones produced abroad are perfect substitutes and that value added of a product strictly accrues to the country of production (or origin) of a product. Under the customary textbook assumptions, two results emerge: (i) protectionism is always bad (in terms of welfare) for small economies; and (ii) a modest degree of protectionism (i.e., tariffs that are not too high), may be positive for large economies. However, the positive note on protectionism comes with many strings attached. Most importantly, retaliation and cross-border complementarities through the integration in global value chains are ruled out. Both of these conditions are not met with the current U.S.-China "trade war": China retaliates, and many U.S. firms are integrated with input suppliers in the Chinese market. This is why we see opposition to the tariffs from various sectors in the U.S. (e.g., in agriculture for the former argument and in shoe production for the latter argument), including ones that are targeted by protectionist tariff measures.

With stronger complementarities, we would expect "trade-war" tariffs to rather exert negative effects, and particularly in sectors, which heavily rely on inputs from tariff-targeted foreign countries. Moreover, we expect negative effects on firms, which are more strongly affected by the negative shock of foreign retaliatory tariffs.

[4] Bown (2018) even goes one step further in saying that not only the long-run effects but even the long-run strategy of the tariffs against China is less than clear.

[5] Both tariff announcements and implementations contained an element of surprise. The reason is that all announcements of new tariff margins were accompanied by some hope that they might not be implanted after all. Indeed, some of the announced new tariffs had been revoked in the curse of the dispute. Hence, when pre-announced tariffs had been actually implemented, there was an additional element of surprise.

3. Chronology of the U.S.-China "Trade War"

As indicated above, what is dubbed the "U.S.-China trade war" by some should be seen as one component of what Bown (2018) called president Trump's "unilateral trade policy" approach. In any case, one of the roots of the conflict was the imposition of a 30% tariff rate by the U.S. on imports of solar panels – not only from China but from anywhere – on January 22, 2018, with the prospect that this rate would be cut again to one of 15% after four years. On the same day, also a tariff rate of 20% was placed by the U.S. on washing machines for the first 1.2 million units imported during the year, again not targeting explicitly China. In spite of the generic imposition of these tariffs on imports from anywhere, their implicit aim on China was clear, as it is now the world's largest producer and exporter of solar panels, and its exports of washing machines amounted to several hundred million U.S. dollars prior to the imposition of the tariff.

On March 1 of 2018, tariffs of 25% on steel and 10% on aluminum were imposed by the U.S.. While these tariffs affected China as well, they had an even greater effect on some other countries, including U.S. allies such as Canada and South Korea (see also Bown, 2018, on this issue). Further proclamations regarding these products were instituted subsequently in March 2018.

On March 22, 2018, the first explicit measures of the U.S. against China were debated in public, when President Trump asked the United States Trade Representative (USTR) to consider applying tariffs on Chinese goods with an ex-ante value of US$ 50-60 billion. The justification for this action was anchored in Section 301 of the Trade Act of 1974, calling the tariffs a response to China's unfair business and trade practices in the past, mentioning explicitly the violations of intellectual property rights.

On April 2, 2018, China responded by taking the first retaliatory measures, imposing tariffs on 128 products imported from the U.S., including aluminum, airplanes, cars, pork, and soybeans (all at a tariff rate of 25%) as well as fruit, nuts, and steel piping (taxed at a tariff rate of 15%). As a response to these retaliatory actions by China, the USTR published a list of products imported from China that could be subject to additional tariffs. The proposed list covered approximately 1,300 separate tariff lines. On April 4, 2018, China retaliated with a list of similar tariffs on key U.S. imports including soybeans, planes, cars, and chemicals. On April 5, 2018, President Trump responded by an open consideration of another round of tariffs on an additional US$ 100 billion worth of Chinese imports, which was responded to on April 6, 2018, by China, requesting consultations regarding those new tariffs at the World Trade Organization (WTO).

On May 15, 2018, the Vice Premier Minister to China, Liu He, in his capacity as the top economic advisor to China's President Xi Jinping, visited Washington to formally initiate trade talks. As an outcome of these talks, on May 20, 2018, Chinese officials agreed to help substantially reducing the U.S.'s trade deficit with China through a "significant increase" of the purchases of U.S. goods by China. As a result of this commitment, Treasury Secretary Steven Mnuchin announced to put "the trade war on hold."

Yet, on May 29, 2018, the White House announced to impose a 25% tariff on another US$ 50 billion of Chinese goods involving "significant technology;" with the publication of a list of such products being announced for publication by June 15, 2018. Moreover, investment restrictions and

enhanced export controls on certain Chinese individuals, companies, and organizations were discussed with the goal to prevent them from acquiring U.S. technology. This led China to threaten the U.S. with discontinuing the just-begun trade talks with Washington, should those envisaged sanctions become effective. Indeed, on June 15, 2018, President Trump declared a 25% tariff on US$ 34 billion worth of goods to become effective from July 6, 2018, onwards and on a further US$ 16 billion worth of goods at a later stage. China's Commerce Ministry accused the U.S. of launching a trade war and announced that China would respond in kind (announcing tariffs on US$ 50 billion of U.S. goods), also starting on July 6, 2018. Three days later, the White House declared that the United States would impose an additional tariff rate of 10% on another US$ 200 billion worth of imports from China, if China retaliated against the announced 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.

On July 10, 2018, the U.S. released an initial list of the said additional US$ 200 billion of Chinese goods that would be subject to a 10% tariff. And by way of a retaliation, China vowed to levy tariffs on U.S. goods worth US$ 60 billion annually two days later.

On August 1, 2018, the U.S. Trade Representative Robert Lighthizer released the statement that the President had directed him considering increasing the proposed level of the additional tariffs from 10% to 25%, which would be applied to the proposed list of products previously announced on July 10. On August 7, 2018, the Office of the USTR published the finalized list of 279 Chinese products, worth US$ 16 billion, which would be subjected to a 25% tariff rate from August 23, 2018. China retaliated to the U.S. actions from August 1 on August 3 with additional tariffs declared on U.S. goods worth $60 billion annually, and it responded to the actions from August 7 on August 8 with its own tariffs of equal value, also to be implemented on August 23, 2018. On August 14, 2018, China filed a complaint with the World Trade Organization (WTO), claiming that the U.S. tariffs on foreign solar panels violated WTO rules and had destabilized the international market for photovoltaic products. China claimed the resulting impact directly harmed China's legitimate trade interests.

On August 22, 2018, U.S. Treasury Undersecretary David Malpass and Chinese Commerce Vice-Minister Wang Shouwen met in Washington D.C. in a bid to reopen negotiations. However, on August 23, 2018, the said U.S. tariffs on US$ 16 billion of Chinese goods and China’s own tariffs on the same value of imports from the U.S. came into effect, and on August 27 China filed a new WTO complaint against the U.S. regarding the additional tariffs.

On September 18, 2018. the U.S. announced the tariff rate of 10% on US$ 200 billion worth of Chinese goods to come into effect on September 24. These tariffs were declared to be raised to 25% by the end of 2018. Moreover, the U.S. threatened to launch further tariffs on an additional US$ 267 billion worth of imports from China, should China choose to retaliate on the measures taken by the U.S. On the same day, China did retaliate with a tariff rate of 10% on US$ 60 billion of imports from the U.S. Up until then, China had either imposed or announced tariffs on US$ 110 billion of U.S. goods, covering most of its imports from the U.S.

On December 1, 2018, the planned increases in tariffs were postponed with an attempt to end the “trade war”, and the White House stated that both parties would "immediately begin negotiations

on structural changes with respect to forced technology transfer, intellectual property protection, non-tariff barriers, cyber intrusions and cyber theft."

In May 2019, the U.S. China "trade war" gained momentum again, which shows in renewed tariff usage by the United States in May and associated retaliation responses by China in early June 2019.

< Figure 1 about here >

Figure 1 provides a graphical representation of the "trade-war" events in 2018 and 2019. Of those events, we only use the U.S. tariff actions which explicitly targeted China and retaliatory ones by China against the U.S.. Moreover, as by the time of the revision of this manuscript only stock-market data with at least 10 days after the event were available up until May 2019, our analysis does not cover data from June 2019 onwards.

4. Research Design

The research design involves a customary two-step structure. In what follows, we will describe the approach in detail for each step.

Step 1:

In the first step, we decompose daily stock-market returns of each company around the date of each event of interest into their systematic and their idiosyncratic component. Let us use $FirmReturn_{ite}$ to denote firm-level stock-market returns of firm i on day t. We focus on days 610 to 361 prior to event e in the first step of the analysis. This is done to avoid an influence of any considered "trade-war" event on $FirmReturn_{ite}$ in the estimation window.[6] Specifically, by this choice the end of the estimation window for the last event considered in this study – namely, the one on May 13, 2019 – is December 31, 2017, which is prior to any events of 2018. Denoting the date or day at which event e happened by T_e, this means that t takes on values between T_e-610 and T_e-361. One important issue needs to be considered here, namely that there is a time difference between the trading hours in the United States and in some Oceanian and Asian economies included here – Australia, China, Indonesia, Japan, South Korea, and Taiwan. To consider this issue, we use the treatment day as to be T_e+1 in these economies whenever the treatment (a tariff increase) was

[6] The U.S.-China "trade war" is somewhat different from the trade-policy events that had been studied in the related literature mentioned in Section 2 in that it is composed of several events, as outlined above. The main differences are two. First, the information that can be used is very detailed in that we have well-specified sector-level tariff changes which can be matched onto firms. Hence, the treatment exposure is heterogeneous across firms, and this heterogeneity helps improving the identification. Second, there is not a one-shot announcement as is customary in studies on stock market effects of trade agreement announcements, but there is a sequence of events. This means that U.S.-China "trade-war" events prior to subsequent events, especially, ones in the second half of 2018, may have an impact on the parameters which co-determine the cumulative abnormal stock-market returns measured around the time of later events. We explicitly address this point in the robustness section of the paper, where we choose an alternative pre-event window which is not specific to event e but uses the same daily data within the year 2017 for all events analyzed, here.

announced by the United States. However, whenever China announces a treatment, the U.S. is taken to react on the same day, consistent with the time difference. Moreover, we follow Davies and Studnicka (2018) to specify the "normal" or systematic returns of a firm as an additive function of three components, a firm-event-specific constant (average), α_{ie}, the return on the MSCI national equity index at the end of day t before event e, $\text{MarketReturn}_{ite}$, and the import-share weighted nominal exchange rate of the country (territory) of firm i at day t before event e, EffExchRate_{ite}.

Formally, in the first step we estimate the following regression equation:

$$\text{FirmReturn}_{ite} = \alpha_{ie} + \beta_{ie}\text{MarketReturn}_{ite} + \gamma_{ie}\text{EffExchRate}_{ite} + \varepsilon_{ite} \quad \text{over } t=[T_e\text{-}610, T_e\text{-}361]$$

where the estimated prediction of $\alpha_{ie} + \beta_{ie}\text{MarketReturn}_{ite} + \gamma_{ie}\text{EffExchRate}_{ite}$ obtains the systematic component of the one-day return FirmReturn_{ite}, EffExchRate_{ite} is the import-share weighted nominal exchange rate of the country (territory) of firm i at time t in estimation window e. We refer to this exchange rate as the effective exchange rate. The term ε_{ite} is the idiosyncratic residual. The expectations about the mean and the variance of ε_{ite} are $E(\varepsilon_{ite})=0$ and $E(\varepsilon_{ite}^2)=\sigma_{ie}^2$. As the dependent variable is measured in logs, so is ε_{ite}. Subsequently, will refer to the latter as abnormal returns (AR) and define

$$\text{AR}_{ite} = \text{FirmReturn}_{ite} - (\hat{\alpha}_{ie} + \hat{\beta}_{ie}\text{MarketReturn}_{ite} + \hat{\gamma}_{ie}\text{EffExchRate}_{ite}) = \hat{\varepsilon}_{ite},$$

where a hat indicates regression estimates. For a stock to be included in the first-step regression, we require that the minimum number of observations (days) for the estimation window is 90. Hence, stocks with observations in the estimation window with less than 90 days are excluded.

Step 2:

While the estimation of the parameters (α_{ie},β_{ie}) uses data from the time window T_e-610 to T_e-361, we use the estimates thereof to predict AR_{ite} for a time period closer to the event. Let us use another index s={1,3,5,7,10} for days around an event. Then, we can define cumulative abnormal returns (CAR) for firm i, day s, and event e as the dependent variable for the second step:

$$\text{CAR}_{ies} = \sum_{t=T_e-1}^{T_e+s} \text{AR}_{ite} \text{ for s=}\{1,3,5,7,10\}.$$

Since s=10 requires data from one day before T_e up until 10 days after T_e, we use 12 day-data points for this window. For the ease of comparison of estimates, we therefore only include firms in the second step regarding event e, for which stock-market data in all 12 days from $T_e - 1$ to $T_e + s$ are available. Hence, stocks with observations in the post-event window with less than 12 days are excluded generally in the second step. For a more complete exposition, we also consider the abnormal return on the event date T_e as a dependent variable in the second step.

In Step 2, CAR_{ies} is used to learn about its responses to, mainly, changes in direct and indirect "trade-war" tariff changes. [7] We will use a direct-tariff-change vector with four elements

[7] One could be worried about anticipation effects. However, we do not believe that those are of major importance here because of the design of the study. The reason is that we identify parameters from exact tariff-change levels as

$$\text{DirectTariff}=(\text{DirectTariff}_{USA,USA},\text{DirectTariff}_{USA,CHN},\text{DirectTariff}_{CHN,USA},\text{DirectTariff}_{CHN,CHN})$$

for direct tariff changes associated with actions of the United States and China, respectively, where the first index refers to the country which takes the tariff action, and the second index pertains to the country where the firms are located (United States or China) that these tariffs are supposed to affect.

Furthermore, we will use a vector with two elements regarding "trade-war"-related indirect tariff changes during the time windows of investigation:

$$\text{IndirectTariff}=(\text{IndirectTariff}_{USA}, \text{IndirectTariff}_{CHN}),$$

where we only use a single index for the country imposing the respective tariff, as any included economy will be affected – depending on its "position" in the input-use-related world-input-output network. In any case, the elements of IndirectTariff refer to input-Leontief-inverse-matrix-weighted tariff changes of the countries indicated by the subscript. We will define these measures in Section 5.2 and note here only four things. (i) We construct these tariffs in a way so that they are defined in the same (2-digit ISIC) sectoral classification as the one used in the World Input Output Database (WIOD). (ii) Given that we can map the sector classification of all listed firms in the data to the same (2-digit ISIC) sectoral classification, the "trade-war" tariff-change measures can be matched to each firm i around each event e and day s. (iii) We will distinguish in this second step three subsamples of firms: one pertaining to U.S. firms only, one pertaining to Chinese firms only, and one pertaining to a rest of countries and territories (third parties). Clearly, the measures in DirectTariff only matter for the first two subsamples, while IndirectTariffUSA and IndirectTariffCHN matter for firms in the United States, China as well as in third countries and territories. (iv) Finally, we include the log value of market capitalization (MarketCap) of firm i measured at the end of 2017 from Datastream as a control variable.

The second-step regression equation, when including country(territory)-event-window-time as well as WIOD 2-digit sector-event-window-time fixed effects (denoted as $FE_{sector(i),es}$) then reads

$$CAR_{ies} = \text{DirectTariff}_{ies}\gamma + \text{IndirectTariff}_{ies}\delta + \zeta\text{MarketCap}_i + \text{Controls}_{ies}\,\eta +$$

$$FE_{country(i),e} + FE_{sector(i),e} + u_{ies},$$

where (γ,δ) are regression parameters of interest on the tariff-change vectors $\text{DirectTariff}_{ies}$ and $\text{IndirectTariff}_{ies}$, MarketCap_i is a control variable with parameter ζ, Controls_{ies} are the direct and indirect tariffs imposed by Russia against the United States on July 6, 2018 (we refrain from reporting those results, as the focus here is on the United States and China), $FE_{country(i),e}$ and $FE_{sector(i),e}$ are country(territory)-event-window-time and WIOD-sector-event-window-time fixed effects, and u_{ies} is an error term which we allow to be heteroskedastic and to feature a clustering pattern at the WIOD 2-digit sector level. The fixed effects capture all factors of influence which

announced or implemented. Hence, we deem it unlikely that the exact amount of tariffs, the exact sector, and the exact date of announcement had been foreseen by investors at global stock markets.

are common to the firms in an economy within an event window and ones which are common to firms in a sector in an event window.

With the mentioned second-step regressions, the following considerations regarding identifying assumptions are important. First, unlike in standard event studies as, e.g., in Breinlich (2014) or Moser and Rose (2014) regarding the announcement of trade agreements which are supposed to affect all firms in a country, our data include untreated firms as well as treated ones. Hence, we principally identify the effect of tariff changes from changes of CAR within treated as well as between treated and untreated firms. Clearly, the inclusion of sector-event-time fixed effects means that we resort to an identification from changes within sectors and time periods. In this regard, it is important to note that tariffs for firms in the same main sector and country (territory) still vary between firms, as we weight the tariffs by the operating income in up to 10 sectors reported in the firm data. Second, our data include treated firms with a heterogeneous degree of treatment (for the just-mentioned reason but also due to larger or smaller positive or negative tariff changes or announcements relative to the period prior to the event within any sector). These two features put our study in between the categories of event studies, difference-in-differences studies for binary treatments, and studies on heterogeneous, continuous treatment effects. As the dependent variable, $\mathrm{CAR}_{\mathrm{ies}}$, is based on changes (differences) of stock-market returns between dates, we identify the treatment effect of a point increase in operating-income-weighted tariff rates (directly and indirectly) from between firms within a sector, where the sector affiliation is measured by the primary source of operating income.

5. Data

In general, we will include data on all 40 economies covered by the WIOD in our analysis. These are the following. Direct parties to the "trade war" (2): China and United States. Third parties to the "trade war" (38): Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, India, Indonesia, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Mexico, Netherlands, Poland, Portugal, Romania, Russia, Slovenia, Slovak Republic, South Korea, Spain, Sweden, Taiwan (China), Turkey, and United Kingdom. At the heart of the analysis are stock-market data as well as "trade-war"-related tariff-change data. We will devote separate subsections to each of those.

5.1 Stock-market Data

We use daily stock-market data in a window of days around each US-China "trade-war" tariff-announcement or –implementation event from *Datastream* for the aforementioned economies.

We consider 19 events in this estimation including:

Year 2018: March 29, April 2, 3, and 4, June 15 and 16, July 6 and 10, August 1, 3, 7, 8, and 23, September 18 and 24, December 14.

Year 2019: May 5, 10, and 13.

We do not consider the event of June 1 in 2019, as the required post-event data were not available at the time when we began analyzing the data for the revision of this paper.

We retrieve stock-return data on active companies listed on local stock exchanges for each economy from Datastream. These data underly the dependent variable FirmReturn as well as the explanatory variable MarketReturn used in either step above. As the first-step regressions obtain some extreme values in the first and the 99th percentile of the CARs, we winsorize the data in these percentiles. The final sample used in the first-step and second-step regressions includes 31,217 firms amounting to 543,304 observations across all events. Figure 2 illustrates the distribution of firms across the included countries and territories. The total market capitalization of these firms accounts for about 81% of the world's total market capitalization.

< Figure 2 about here >

5.2 "Trade-war" Tariff-change Data

We then obtain the lists of products on which "trade-war" tariffs were announced or imposed for each event from each country's official websites. The United States and China report these tariffs by using HTS codes, which we convert to HS2017 6-digit product lines. We use concordance tables from the United Nation to convert 6-digit HS2017 codes first to 5-digit STIC rev.3 codes and subsequently to ISIC rev.3 4-digit codes. This is done, because firms in Datastream have between one a ten sector codes, while tariffs are levied on products rather than sectors. Finally, we convert the tariff-change data from the 4-digit ISIC industry classification into the ISIC rev. 3 2-digit sector classification used by WIOD. The latter permits measuring direct tariff changes and input-output-intermediated indirect ones at the same level of granularity. Specifically, for this we use the WIOD table for 2011 as released in 2013. The number of WIOD 2-digit sectors also makes it possible to summarize the announced or imposed "trade-war" tariff-rate changes for each event in Table 1.[8]

< Table 1 about here >

As mentioned above, for our analysis it is useful to distinguish between three groups of economies by splitting the data into three subsamples: the United States and China as the two directly involved and affected economies, and a Rest of the economies (consisting of the 38 economies listed at the beginning of Section 5). Moreover, each of these subsamples involves firm-level abnormal returns on the event date and the cumulative abnormal returns which are defined within a window – namely

[8] For the additional tariff rates China imposed on U.S. products, some products from the same WIOD sector are imposed different additional tariff rates. In this case, we take the average of them as the industry-level additional tariff rates.

1, 3, 5, 7, and 10 days after an announcement or implementation event regarding import tariffs set by the United States and/or China against each other.

Regarding the tariff data, three different effects are worth distinguishing: (i) direct (protection) effects of a country (United States or China) to shield specific products by a "trade-war" tariff differential against competition from the other party (China or the United States); (ii) direct (protection) effects of a country's "trade-war" tariff setting on the competitor (China or the United States); and (iii) indirect effects which affect any sector and economy in the world – the two involved economies as well as the Rest – through input-output linkages and indirect price effects.

We will use the four aforementioned elements in the vector DirectTariff to denote tariffs set by the United States against China and ones set by China on the United States. Each of these tariffs will be some positive number, whenever a certain tariff had been announced or implemented on a product pertaining to the same sector a given firm belongs in for which we measure the CAR.[9] In order to respect arguments (i) and (ii) from above, $\text{DirectTariff}_{\text{USA,USA}}$ and $\text{DirectTariff}_{\text{CHN,USA}}$ take on positive values in the sample of firms/stocks in the United States whenever they are relevant, and the same is true for $\text{DirectTariff}_{\text{CHN,CHN}}$ and $\text{DirectTariff}_{\text{USA,CHN}}$ in the respective subsample of Chinese firms/stocks. As there are no direct effects of the considered "trade-war" tariff changes on the economies in the Rest and the event-time windows considered here, these tariff measures will take on a value of zero in the firm subsamples of other economies.

To respect the argument in (iii) above, we include the two inverse-normalized-input-output-weighted effective tariff changes associated with tariffs imposed by the U.S. or China. These tariffs will be different for each economy (and sector) the firms belong in. The economies are either the United States (in the United States subsample), China (in the China subsample), or any other economies included in WIOD. For a generic sector and economy in the data, $\text{IndirectTariff}_{\text{USA}}$ and $\text{IndirectTariff}_{\text{CHN}}$, capture indirect, "trade-war"-tariff-induced price changes in that country (territory) and sector induced by actions in the United States and China, respectively.

For the construction of the IndirectTariff measures, we consider induced effective tariff changes from an input-output perspective. For this, two thoughts are important. First, assuming a perfect pass-through of input prices on output prices, as the U.S. (China) imposes an import tariff on products from China (the U.S.), the prices of output of any industry in the U.S. (China) will rise proportionately, and the degree to which this happens depends on the weight of the inputs from China (the U.S.) in all inputs of the industries in the U.S. (China). More specifically, we use the WIOD-input-share weighted tariff changes for the U.S. and China, respectively, and we then weight these changes by the weights from the inverse normalized (so that entries are input shares from sectors and countries (territories) in a using sector and country (territory)) WIOD matrix for the year 2011. The latter weights take into account that the international input-output linkages across sectors and countries (territories) have rippling effects, as goods from the U.S. (China) are

[9] However, note that the operating income of a firm in a sector can potentially be negative around an event time. Then, the weighted average tariff change for a firm can be negative around an event date in spite of positive tariff changes. For this reason, the minimum weighted tariff in Table 2 can be negative.

used as inputs in the same and other sectors of the U.S. (China) and elsewhere, and these goods (and services) are subsequently used as inputs in production, etc.

Formally, $\text{IndirectTariff}_{USA}$ and $\text{IndirectTariff}_{CHN}$ are computed as follows. Let us define a matrix **W** which is based on the WIOD international input-output matrix of 2011 (released in 2013). The matrix is organized such that rows pertain to users and columns to makers. While the original WIOD matrix contains 35 sectors for products and as many columns for each economy pair, **W** only contains 30 sector rows and columns for every economy pair. The reason is that we sum up the columns for the following sector pairs to eliminate rows of zeros only: (i) *Textiles and Textile Products* together with *Leather, Leather Products, and Footwear* is treated as a single sector; (ii) *Coke, Refined Petroleum, and Nuclear Fuels* and *Chemicals and Chemical Products* are treated as a single sector. (iii) *Sale, Maintenance and Repair of Motor Vehicles and Motorcycles, and Retail Sale of Fuel* is summed together with *Wholesale Trade and Commission Trade, Except Motor Vehicles and Motorcycles*; (iv) *Pubic Administration and Defense and Compulsory Social Security* is added together with *Other Community Services, Social and Personal Services* as well as *Employment in Private Households*. Apart from the latter adjustment, we normalize the resulting cells by the maximum row sum. Accordingly, the entries of every row of **W** are bounded. The overall size of **W** is 1200 x 1200 (40 is the number of economies and 30 the number of aggregated sectors in WIOD; and 1200=40*30). Define **I** as a 1200 x 1200 identity matrix. A Leontief-type inverse corresponding to **W** can be defined as $\mathbf{R}=(\mathbf{I}-\mathbf{W})^{-1}=\mathbf{I}+\sum_{p=1}^{\infty}\mathbf{W}^{p}$. Denote the 30 x 1 vectors of tariff changes in the U.S. and in China for a generic event by $\mathbf{D}_{USA}$ and $\mathbf{D}_{CHN}$, respectively, and define 1200 x 1 vectors $\mathbf{J}_{USA}$ and $\mathbf{J}_{CHN}$ which are all zeros except for the elements of $\mathbf{D}_{USA}$ and $\mathbf{D}_{CHN}$ in the 30 x 1 row blocks pertaining to the U.S. and China as using countries, respectively. Then, indirect effects of the tariff changes of the U.S. and China can be written in vector form as $(\mathbf{R}-\mathbf{I})\mathbf{J}_{USA}$ and $(\mathbf{R}-\mathbf{I})\mathbf{J}_{CHN}$, respectively.

What is important to recall in what follows is that DirectTariff and IndirectTariff are direct and indirect tariff-change measures exclusively related to the U.S.-China "trade war". And the indices in DirectTariff and IndirectTariff tell, which country's tariff change we want to capture (the United States' or China's). To the extent that the U.S. set "trade-war"-type tariffs also against other economies than China and, in response, other economies set retaliatory tariffs, we also construct direct and indirect tariff-related ad-valorem-price-change variables and control for them as long as such changes occurred within the event windows under consideration, here. However, as the focus of the paper is on the U.S.-China "trade war", we do not emphasize the related results and treat such variables merely as controls in the regressions, as indicated above.

5.3 Descriptive Statistics

In Table 2 we summarize descriptive statistics on AR and CAR as well as the elements of DirectTariff and IndirectTariff as well as MarketCap when pooling the data across economies and event windows.

< Table 2 about here >

The data are pooled for 40 economies (USA, CHN, Rest) which altogether host 31,217 firms which are used in the analysis and 19 event dates. Overall, there are 543,304 observations which can be used in the average one of five windows of days after each treatment (1, 3, 5, 7, 10 days). The content of the table indicates in particular that the elements of DirectTariff are measured as 10^{-3} times a percentage tariff change (i.e., a value of 0.015 indicates an increase in these measures by 15% due to the "trade war"). The variables in IndirectTariff are also measured as 10^{-3} times a percentage tariff change. These normalizations are chosen in order to scale the parameters on these measures for better display in tables.

In Figure 3 we plot average CARs for each WIOD industry in the U.S., China, and the Rest for the event date of June 15, 2018 to give an illustrative example. The horizontal line represents days after the event date of June 15, and the vertical line represents average CARs. The long-dashed lines represent average CARs for U.S. firms in each industry; the solid lines represent average CARs for Chinese firms in each industry; and the short-dashed lines represent average CARs for Rest-country(territory) firms in each industry. Since there is no firm in WIOD sector L for China in our sample, we do not plot average CARs for this sector in China.

< Figure 3 about here >

We observe that after the United States' announcement, average CARs for Chinese firms in most of the industries dropped dramatically. Average CARs for U.S. firms in several – but not all – of the industries appear to have slightly increased, mostly in the first few days after the event. And firms in the 38 Rest economies on average appear to also have suffered from this announcement. The regressions will exploit this information for all events in the data together.

6. Estimation Results

In what follows, we present the results based on estimates of the second-step equation as outlined in Section 4 for the mentioned 31,217 firms and 19 event dates in Table 3. The table is organized in six columns for day-wise after-event-time windows.

< Table 3 about here >

In the discussion of the results, we focus on the main findings for the sake of brevity.

Observation 1: On average, the "trade-war" tariffs of the U.S. and China directly hurt firms abroad as intended but also at home.

Table 3 suggests that the direct effects of tariff announcements and implementations are mostly negative. For instance, the tariffs announced by the United States, $\text{DirectTariff}_{\text{USA,USA}}$ and

$DirectTariff_{USA,CHN}$, are negative. The effect of $DirectTariff_{USA,USA}$ (i.e., the unintended one on domestic stocks) is not only negative but appears to be even much bigger than the one of $DirectTariff_{USA,CHN}$ (i.e., the intended effect on Chinese firms). This may reflect the pricing-in of stock markets of expected complementarities between effects abroad and at home as, e.g., reflected in tariff retaliations, cross-border value-chain integration, etc.

The direct effects of China's retaliatory tariffs also tend to be negative, but quantitatively more so on U.S. firms than domestic ones. The point estimates on $DirectTariff_{CHN,USA}$ and also more so on $DirectTariff_{USA,USA}$ seem to be almost monotonically increasing during the duration of an event window.

The reason for why the effects differ across the cumulative post-treatment time intervals is that there may be dynamic adjustment. With dynamic adjustment, there would be a dynamic multiplier so that shocks would have smaller immediate effects and bigger ones in the long run.

Observation 2: The global-value-chain-mediated indirect effects of the U.S.-China "trade-war" tariffs can be positive or negative, depending on a sector and country(territory)'s positioning in the global value chain.

Indirect tariff changes do not always have positive effects. However, there are clear signs on value-chain-related effects on third parties. There, we should bear in mind that an increase in "trade-war" tariffs does not unequivocally lead to an increase in "long-run" price changes (i.e., the elements of the sector-country(territory)-by-sector-country(territory) Leontief-inverse input-coefficient matrix are not positive throughout, nor do they sum up when weighted with U.S. and Chinese tariff changes to something positive for all economies and sectors).

The values of explanatory power (the R^2) are relatively modest from the viewpoint of studies of aggregate data. However, this result is not surprising, when considering that the dependent variable is based on residuals of regressions at the individual firm level with daily information. In what follows, we will briefly discuss in which range the effects lie for the individual regressors. We do so by summarizing the findings by way of two tables, always focusing on the effects on the CAR after 10 days in an event window for the sake of brevity. Clearly, such an analysis is only interesting for the subset of observations, where tariff changes were non-zero. Hence, we focus on a summary of the results for the respective subset of data. In each table, we report on statistics which pertain to the micro data which vary across firms/stocks and event dates as well as on averages of these data across countries (territories), sectors, and event dates.

< Tables 4 and 5 about here >

In Table 4, we report on summary statistics of the magnitude of each tariff regressor times the corresponding parameter estimate based on Table 3. The table reports moments of these statistics for each tariff variable (scaled up by 100) in a respective row for observations, where some tariff change occurred. Clearly, to the extent that the elements of DirectTariff only matter for the U.S.

and China, we focus on those countries with direct tariff effect. In general, in the table we summarize those effects, where an underlying tariff change was non-zero. This is meant to give an insight into the magnitude and heterogeneity of effects for actual changes (announcements or implementations of "trade-war" tariffs).

In Table 5, we square these tariff-variable-specific contributions and normalize them by the squared value of the dependent variable and scale them up by 100 (so that they are measured in percent).

The results suggest that, on average, the direct effects on firms in the United States are the largest (exhibit the biggest average value in absolute terms in Table 4 and then explain the biggest average share of the variance in Table 5). To see this, consider the statistics for the mean values with the variables/rows for $\text{DirectTariff}_{\text{USA,USA}}$ and $\text{DirectTariff}_{\text{CHN,USA}}$ in the two tables and compare them with the values for other variables in DirectTariff or IndirectTariff. Moreover, the indirect effects induced by tariff changes of the United States ($\text{IndirectTariff}_{\text{USA}}$) are much larger than those of China ($\text{IndirectTariff}_{\text{CHN}}$). Hence, the effect indirectly (through global-value-chain relationships) induced by U.S. tariffs on the average firm/stock in the average event in the data is much bigger than the one induced by China.

7. Extensions and Robustness

In this section, we present two alternative sets of results to the ones in Section 7.

In the first one, we present results for firms in sectors A-D (agriculture, mining, and manufacturing) only, as these were the sectors, where most of the tariffs had been announced or implemented.

In the second one, we choose a fixed reference window rather than a rolling one which is anchored in the event date. This exercise serves to illustrate that the coefficients which are obtained in the first step to compute the abnormal and cumulative abnormal returns, the latter being the dependent variable in the second step, are not a spurious outcome of the choice of a specific estimation window.

In the third set of results we allow the tariff responses of the CAR to be sector specific. Hence, beyond the intercepts, which are estimated for each country (territory) and event window on the one hand and each sector and event window on the other hand separately, we also allow the slope parameters to be sector specific in this exercise.

7.1 Results for Firms in Sectors A-D only (Agriculture, Mining, and manufacturing)

Note that most of the tariffs during the trade-war episode had been announced and implemented on products belonging into the categories of agriculture, mining, and manufacturing. In order to make sure that the results are not driven by indirect effects on services, we run a separate set of regressions using data for 17,183 rather than 31,217 stocks or 300,818 rather than 543,304 observations in WIOD sector categories A-D only. The corresponding results are summarized in Table 6.

< Table 6 about here >

The parameters reported in this table clearly document that the results are not driven by using (zero-tariff) services sectors where only indirect effects materialize in conjunction with goods sectors, where direct as well as indirect effects can matter.

7.2 Constant Pre-"trade-war" Time Window to Estimate First-step Abnormal-returns Parameters

We provide the analogue to Table 3 for second-step results in the case with a fixed first-step estimation window of 250 days during 2017 for all stocks in the data. Here, we focus on a discussion of the main findings from the associated analysis based on Table 7.

< Table 7 about here >

An inspection of the parameters in Table 7 and their rolling first-step-window-based counterparts in Table 3 of Section 6 suggests that the two sets of results are qualitatively similar. The direct effects tend to be stronger in Table 7 than in Table 3, and the indirect effects of China tend to be negative.

7.3 Estimating CAR-responses to "Trade-war" Tariffs for Each WIOD Sector Separately

The earlier analysis was focused on pooled results and assumed that sector-level responses to announced tariff rates (normalized by the extent of tariff change) were similar. However, there are reasons to assume that sector-level responses may be heterogeneous. E.g., we know that price responses might depend on the underlying distribution of competitors in terms of their productivity (e.g., in Ricardian models of the type as proposed by Eaton and Kortum, 2002; or in models with monopolistic competition as proposed by Melitz, 2003). Moreover, the price-elasticity-of-demand parameters may be sector-specific.

In order to do justice to these arguments, we provide the same analysis as above when considering (WIOD-)sector-specific parameters on all included variables in this subsection. As before, we exploit the variation within country(territory)-event-time and sector-event-time as in Table 3, but we now permit the slope parameters on all tariff variables (and other covariates) to be sector-specific.

Table 8 summarizes results regarding all (Panel A) and exclusively statistically significant coefficients (Panel B) for the parameters of interest. For the sake of brevity, let us focus on a discussion of Panel B for statistically significant coefficients. Note that the potential number of coefficients estimated per sector is up to 30 for the elements in DirectTariff and IndirectTariff.

In Table 8, we report on moments of these coefficients in the distribution of up to 30 elements: the minimum (Min.), 25th percentile (P25), median or 50th percentile (P50), 75th percentile (P75), and

the maximum (Max.). Before considering the estimates, we should bear in mind that when estimating at the sector level, some of the effects may be hidden in constants as the variation in both the dependent variable and in tariff changes within a sector tends to be much smaller than when pooling the data.

< Table 8 about here >

If we compare the results for the AR on the event date to the CAR after 10 days in an event window in the column P50, which refers to the median sector, the numbers in the table suggest that, for the U.S., most of the sectors were negatively affected through direct effects induced by U.S. tariffs against China. On the other hand, most of the sectors in the U.S. were actually positively affected through direct effects induced by China's retaliatory tariffs against the U.S. when using sector-level parameters.

We find that most of the sectors in China were negatively affected through direct effects induced by the U.S. tariffs against China in all windows, and most of the sectors in China were negatively affected through direct effects induced by China's tariffs against the U.S. in all windows. Finally, most of the sectors were negatively affected through indirect effects induced by China.

8. Conclusions

This paper provides a first systematic glance at stock-market responses to the tariff actions that were announced and partly implemented in 2018 in the context of what some call the U.S.-China "trade war" and others call a "trade dispute".

The effects of this "trade war" or "dispute" are much more complex than probably intended in the political agendas of the parties to the trade war. At this point, we can see that the trade dispute definitely had unintended effects. We see negative cumulative stock-market reactions in the United States on its own firms, and some, though less pronounced, unintended negative consequences of China's retaliatory measures on its own firms. Moreover, there are unintended effects on these as well as on third parties which are mediated by global-value-chain interdependencies, whereby all sectors and economies on the globe are somehow technologically interrelated with each other through input-output relationships. Hence, overall our results suggest that the U.S.-China "trade war" appears to have resulted partly in the exact opposite of what it at least officially attempted to do. Firms in the modern world are organized in complex ways across the boundaries of both sectors and economies. Implementing well-targeted protectionist tariffs in such a world is not easy and, eventually, as in the U.S.-China "trade-war" example, such tariffs may hurt those they are meant to protect. This may not come as a surprise to economists, but we believe documenting it is useful for the debate.

Clearly, our analysis is systematic in that it recognizes the exact measures taken and their timing, but it is limited in various ways which is hard to avoid given the timeliness of the paper's agenda.

First of all, we are forced to consider relatively short-run reactions at stock markets. How long-lived the effects will turn out and how deeply they will hurt economies around the globe cannot be answered at this point but requires more extensive, official, revised data which will only become available in years from now. Second, knowing which margins of economic activity (employment, investment, firm entry, trade, etc.) will be affected to which degree also depends on such data and a corresponding analysis will have to wait quite some time. However, what we can say right now is that, on average, the "trade war" or "dispute" was viewed by large businesses – and their investors – as a bane rather than a boon in the directly involved countries as well as elsewhere. At least, this means that some planned investments would have been delayed to a smaller or larger extent. As with Brexit, investors are much more concerned about the economic dismay recent deliberalization attempts and protectionist policy announcements may trigger than politicians proposing them appear to be.

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Appendix A. WIOD industries

WIOD code	Numerical code	Industry
AtB	01-05	Agriculture, Hunting, Forestry and Fishing
C	11-14	Mining and Quarrying
D	15-37	Manufacturing
15t16	15-16	Food, Beverages and Tobacco
17t18	17-18	Textiles and Textile Products
19	19	Leather, Leather and Footwear
20	20	Wood and Products of Wood and Cork
21t22	21-22	Pulp, Paper, Paper, Printing and Publishing
23	23	Coke, Refined Petroleum and Nuclear Fuel
24	24	Chemicals and Chemical Products
25	25	Rubber and Plastics
26	26	Other Non-Metallic Mineral
27t28	27-28	Basic Metals and Fabricated Metal
29	29	Machinery, Nec
30t33	30-33	Electrical and Optical Equipment
34t35	34-35	Transport Equipment
36t37	36-37	Manufacturing, Nec; Recycling
E	40-41	Electricity, Gas and Water Supply
F	45	Construction
50	50	Sale, Maintenance and Repair of Motor Vehicles and Motorcycles; Retail Sale of Fuel
51	51	Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles
52	52	Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods
H	55	Hotels and Restaurants
60	60	Inland Transport
61	61	Water Transport
62	62	Air Transport
63	63	Other Supporting and Auxiliary Transport Activities; Activities of Travel Agencies
64	64	Post and Telecommunications
J	65-67	Financial Intermediation
70	70	Real Estate Activities
71t74	71-74	Renting of M&Eq and Other Business Activities
L	75	Public Admin and Defence; Compulsory Social Security
M	80	Education
N	85	Health and Social Work
O	90-93	Other Community, Social and Personal Services
P	95	Private Households with Employed Persons

Table 1. Additional tariff rates.

Panel A. U.S. against China (%).

Year	2018									2019	
WIOD code	4/3	6/15	7/6	7/10	8/1	8/7	8/23	9/18	9/24	5/5	5/10
01-05	25	0	0	10	25	0	0	10	10	25	25
11-14	25	0	0	10	25	0	0	10	10	25	25
15-16	25	0	0	10	25	0	0	10	10	25	25
17-18	25	0	0	10	25	0	0	10	10	25	25
19	25	0	0	10	25	0	0	10	10	25	25
20	25	0	0	10	25	0	0	10	10	25	25
21-22	25	0	0	10	25	0	0	10	10	25	25
23	25	0	0	10	25	0	0	10	10	25	25
24	25	25	0	10	25	25	25	10	10	25	25
25	25	25	0	10	25	25	25	10	10	25	25
26	25	25	0	10	25	25	25	10	10	25	25
27-28	25	25	25	10	25	25	25	10	10	25	25
29	25	25	25	10	25	25	25	10	10	25	25
30-33	25	25	25	10	25	25	25	10	10	25	25
34-35	25	25	25	10	25	25	25	10	10	25	25
36-37	25	0	0	10	25	0	0	10	10	25	25
40-41	0	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0	0	0	0	0
55	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0
61	0	0	0	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0	0	0	0
63	0	0	0	0	0	0	0	0	0	0	0
64	0	0	0	0	0	0	0	0	0	0	0
65-67	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0
71-74	25	0	0	10	25	0	0	10	10	25	25
75	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0
85	0	0	0	0	0	0	0	0	0	0	0
90-93	25	0	0	10	25	0	0	10	10	25	25
95	0	0	0	0	0	0	0	0	0	0	0

Panel B. China against U.S. (%).

Year	2018											2019
WIOD code	3/29	4/2	4/4	6/16	7/6	8/3	8/8	8/23	9/18	9/24	12/14	5/13
01-05	15	15	25	25	25	15	25	25	22.5	22.5	0	15
11-14	0	0	0	25	0	18.3	25	25	26.7	26.7	0	18.3
15-16	20	20	25	25	25	15	25	25	22.5	22.5	0	15
17-18	0	0	0	0	0	15	25	25	22.5	22.5	0	15
19	0	0	0	0	0	15	0	0	22.5	22.5	0	15
20	0	0	0	0	0	16.7	25	25	25	25	0	16.7
21-22	0	0	0	0	0	15	0	0	22.5	22.5	0	15
23	0	0	25	25	0	15	25	25	22.5	22.5	0	15
24	0	0	25	25	0	15	25	25	22.5	22.5	0	15
25	0	0	25	25	0	15	0	0	22.5	22.5	0	15
26	0	0	0	25	0	15	25	25	22.5	22.5	0	15
27-28	15	15	0	0	0	18.3	25	25	26.7	26.7	0	18.3
29	0	0	0	0	0	15	25	25	22.5	22.5	0	15
30-33	0	0	0	25	0	15	25	25	22.5	22.5	0	15
34-35	0	0	25	25	25	15	25	25	22.5	22.5	0	15
36-37	0	0	0	0	0	15	25	25	22.5	22.5	0	15
40-41	0	0	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	-15	0
51	0	0	0	0	0	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0	0	0	0	0	0
55	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0
61	0	0	0	0	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0	0	0	0	0
63	0	0	0	0	0	0	0	0	0	0	0	0
64	0	0	0	0	0	0	0	0	0	0	0	0
65-67	0	0	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0	0	0
71-74	0	0	0	0	0	15	0	0	22.5	22.5	0	15
75	0	0	0	0	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0
85	0	0	0	0	0	0	0	0	0	0	0	0
90-93	0	0	0	0	0	15	0	0	22.5	22.5	0	15
95	0	0	0	0	0	0	0	0	0	0	0	0

Notes: Panel A in this table reports additional tariff rates U.S. announced/implemented against Chinese firms in each WIOD industry on each event date. Panel B in this table reports additional tariff rates China announced/implemented against U.S. firms in each WIOD industry on each event date.

Table 2. Summary statistics

Dependent variable: abnormal return (AR) and cumulative abnormal returns (CARs)					
Window	Obs.	Mean	Std. Dev	Min	Max
(0,0)	543,304	-0.0030	0.0418	-0.2048	0.1698
(-1,+1)	543,304	-0.0075	0.0831	-0.4160	0.3141
(-1,+3)	543,304	-0.0122	0.1166	-0.5901	0.4297
(-1,+5)	543,304	-0.0167	0.1454	-0.7199	0.5304
(-1,+7)	543,304	-0.0203	0.1726	-0.8604	0.6254
(-1,+10)	543,304	-0.0273	0.2129	-1.0848	0.7485
Explanatory variables	Obs.	Mean	Std. Dev	Min	Max
$\text{DirectTariff}_{\text{USA,USA}}$	543,304	0.0000	0.0002	-0.0391	0.0391
$\text{DirectTariff}_{\text{USA,CHN}}$	543,304	0.0000	0.0019	-0.0479	0.7355
$\text{DirectTariff}_{\text{CHN,CHN}}$	543,304	0.0000	0.0031	-1.5216	0.4083
$\text{DirectTariff}_{\text{CHN,USA}}$	543,304	0.0000	0.0002	-0.0417	0.0391
$\text{IndirectTariff}_{\text{USA}}$	543,304	0.0000	0.0005	-0.0159	0.1720
$\text{IndirectTariff}_{\text{CHN}}$	543,304	0.0000	0.0000	-0.0027	0.0045
MarketCap	543,304	4.7064	2.7526	-4.6052	13.6054

Notes: This table reports summary statistics of the dependent and explanatory variables in the second-step regressions for the full sample. $\text{DirectTariff}_{\text{USA}}^{\text{USA}}$, $\text{DirectTariff}_{\text{CHN}}^{\text{USA}}$, $\text{DirectTariff}_{\text{CHN}}^{\text{CHN}}$, and $\text{DirectTariff}_{\text{USA}}^{\text{CHN}}$, $\text{IndirectTariff}_{\text{USA}}$, and $\text{IndirectTariff}_{\text{CHN}}$ are measured in 0.001 percent. MarketCap is the log of firms' market capitalization measured in million U.S. dollars.

Table 3. Second-step regressions

Variables	(0,0)	(-1,+1)	(-1,+3)	(-1,+5)	(-1,+7)	(-1,+10)
$DirectTariff_{USA,USA}$	0.0018	-0.3084	-1.3629*	-1.8323**	-2.0021*	-3.2761**
	(0.157)	(0.443)	(0.752)	(0.786)	(1.039)	(1.259)
$DirectTariff_{USA,CHN}$	0.0038	-0.0123	-0.0542	-0.0667	-0.0261	-0.1113
	(0.019)	(0.046)	(0.084)	(0.093)	(0.108)	(0.139)
$DirectTariff_{CHN,CHN}$	-0.0060***	0.0063	0.0121	-0.0255***	-0.0354***	-0.0332**
	(0.002)	(0.005)	(0.008)	(0.009)	(0.011)	(0.014)
$DirectTariff_{CHN,USA}$	0.1083	-0.6458*	-0.7895	-1.7313**	-1.7201	-1.9595
	(0.216)	(0.353)	(0.542)	(0.773)	(1.046)	(1.193)
$IndirectTariff_{USA}$	-0.6014	-0.5189	3.5532	1.0426	-3.0777	5.6769
	(3.168)	(7.626)	(13.687)	(15.067)	(17.542)	(22.484)
$IndirectTariff_{CHN}$	0.0311*	0.1730***	0.2663***	0.2621***	0.4463***	0.6758***
	(0.017)	(0.050)	(0.069)	(0.086)	(0.097)	(0.126)
MarketCap	0.0001**	0.0007***	0.0011***	0.0012***	0.0014***	0.0016***
	(0.0001)	(0.0001)	(0.0002)	(0.0003)	(0.0003)	(0.0015)
Constant	-0.0014*	-0.0194***	-0.0316***	-0.0393***	-0.0517***	-0.0616***
	(0.001)	(0.001)	(0.002)	(0.003)	(0.005)	(0.007)
Other tariff controls	Yes	Yes	Yes	Yes	Yes	Yes
Sector-event-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country(Territory)-event-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	543,304	543,304	543,304	543,304	543,304	543,304
R-squared	0.039	0.036	0.034	0.031	0.028	0.029

Notes: This table reports the estimation results of the second-step model. White (1980) robust standard errors adjusted for heteroskedasticity and WIOD-industry-level clustering are in parentheses. Coefficient estimates significantly different from zero at 10%, 5%, and 1% levels are marked *, **, and ***, respectively.

Table 4. Summary statistics of the fitted values

Panel A. Full sample (daily firm/stock micro data).

Variable	No. of obs.	Mean	Min	P25	P50	P75	Max
$\hat{\gamma}_1 \text{DirectTariff}_{\text{USA,USA}}$	30,158	-0.0634	-12.7978	-0.0819	-0.0819	-0.0328	12.8071
$\hat{\gamma}_2 \text{DirectTariff}_{\text{USA,CHN}}$	20,268	-0.0037	-8.1546	-0.0028	-0.0028	-0.0011	0.5315
$\hat{\gamma}_3 \text{DirectTariff}_{\text{CHN,CHN}}$	14,389	-0.0002	-1.3546	-0.0008	-0.0007	-0.0005	5.0478
$\hat{\gamma}_4 \text{DirectTariff}_{\text{CHN,USA}}$	24,279	-0.0406	-7.6540	-0.0490	-0.0441	-0.0294	8.1702
$\hat{\delta}_1 \text{IndirectTariff}_{\text{USA}}$	317,812	0.0026	-1.5444	0.0000	0.0001	0.0009	2.5658
$\hat{\delta}_2 \text{IndirectTariff}_{\text{CHN}}$	335,495	0.0005	-1.0750	0.0000	0.0000	0.0001	11.6309

Panel B. Country(Territory)-sector-date averages.

Variable	No. of obs.	Mean	Min	P25	P50	P75	Max
$\hat{\gamma}_1 \text{DirectTariff}_{\text{USA,USA}}$	279	-0.0595	-0.3443	-0.0819	-0.0462	-0.0324	-0.0037
$\hat{\gamma}_2 \text{DirectTariff}_{\text{USA,CHN}}$	294	-0.0035	-0.1145	-0.0028	-0.0021	-0.0011	0.0001
$\hat{\gamma}_3 \text{DirectTariff}_{\text{CHN,CHN}}$	264	-0.0002	-0.0194	-0.0008	-0.0006	-0.0004	0.0780
$\hat{\gamma}_4 \text{DirectTariff}_{\text{CHN,USA}}$	262	-0.0366	-0.7441	-0.0446	-0.0301	-0.0180	0.0294
$\hat{\delta}_1 \text{IndirectTariff}_{\text{USA}}$	9,153	0.0004	-0.0077	0.0000	0.0000	0.0000	0.0806
$\hat{\delta}_2 \text{IndirectTariff}_{\text{CHN}}$	9,913	0.0001	-0.0034	0.0000	0.0000	0.0000	0.1243

Notes: This table reports the summary statistics of the magnitude (scaled by 100) of each tariff regressor times the corresponding parameter estimate based on the estimation results in Table 3 when the CAR from one day before the event up until 10 days after the event is the dependent variable. Panel A reports the summary statistics for the full sample and Panel B reports the summary statistics of the averages thereof across countries (territories), sectors, and event dates.

Table 5. Summary statistics of the contribution of each tariff regressor to the variance in the dependent variable

Panel A. Full sample (daily firm/stock micro data).

Variable	No. of obs.	Mean	Min	P25	P50	P75	Max
$\text{DirectTariff}_{\text{USA,USA}}$	30,097	0.0829	1.2E-10	1.4E-05	0.0001	0.0018	99.3993
$\text{DirectTariff}_{\text{USA,CHN}}$	20,266	0.0114	1.1E-14	2.3E-07	2.4E-06	2.3E-05	79.1366
$\text{DirectTariff}_{\text{CHN,CHN}}$	14,381	0.0039	6.1E-15	8.6E-09	1.2E-07	2.4E-06	22.7484
$\text{DirectTariff}_{\text{CHN,USA}}$	24,176	0.0725	2.4E-10	1.1E-05	0.0001	0.0010	97.3848
$\text{IndirectTariff}_{\text{USA}}$	317,201	0.0030	6.3E-20	3.9E-08	6.3E-07	1.1E-05	90.5685
$\text{IndirectTariff}_{\text{CHN}}$	334,699	0.0025	2.4E-19	3.4E-09	8.1E-08	1.5E-06	95.4788

Panel B. Country(Territory)-sector-date averages.

Variable	No. of obs.	Mean	Min	P25	P50	P75	Max
$\text{DirectTariff}_{\text{USA,USA}}$	269	0.1019	0.0001	0.0048	0.0160	0.0625	2.2940
$\text{DirectTariff}_{\text{USA,CHN}}$	293	0.0102	4.5E-07	3.0E-05	0.0002	0.0007	0.8361
$\text{DirectTariff}_{\text{CHN,CHN}}$	260	0.0033	6.1E-09	1.0E-06	9.7E-06	0.0001	0.3556
$\text{DirectTariff}_{\text{CHN,USA}}$	252	0.0459	1.9E-06	0.0022	0.0084	0.0275	0.9097
$\text{IndirectTariff}_{\text{USA}}$	9,069	0.0021	4.4E-15	1.4E-06	1.4E-05	0.0001	1.8963
$\text{IndirectTariff}_{\text{CHN}}$	9,781	0.0013	6.0E-15	4.5E-08	7.1E-07	9.2E-06	2.9330

Notes: This table reports the summary statistics of the contribution (in percent) of each tariff regressor to the R-squared for each (daily firm/stock) observation based on the estimation results in Table 3 when the CAR from one day before the event up until 10 days after the event is the dependent variable. Panel A reports the summary statistics for the micro (daily firm/stock data) sample and Panel B reports the summary statistics of the averages thereof across countries (territories), sectors, and event dates. We focus on non-zero events exclusively. Hence, the number of observations is much smaller for direct tariff effects, as those only matter for firms/stocks in the United States and China.

Table 6. Second-step regressions for firms in manufacturing, agriculture, and mining only

Variables	(0,0)	(-1,+1)	(-1,+3)	(-1,+5)	(-1,+7)	(-1,+10)
$DirectTariff_{USA,USA}$	-0.0099	-0.241	-1.4403**	-2.0610***	-2.5538**	-3.6587***
	(0.122)	(0.365)	(0.497)	(0.546)	(0.853)	(0.750)
$DirectTariff_{USA,CHN}$	0.0096	0.0001	-0.0362	-0.0721	-0.0295	-0.1106
	(0.013)	(0.039)	(0.041)	(0.056)	(0.084)	(0.071)
$DirectTariff_{CHN,CHN}$	-0.0057**	0.0069	0.0140**	-0.0212***	-0.0316***	-0.0290**
	(0.002)	(0.004)	(0.006)	(0.006)	(0.009)	(0.010)
$DirectTariff_{CHN,USA}$	-0.1581**	-1.1011***	-1.5109***	-2.6454***	-2.8004***	-3.2829***
	(0.067)	(0.143)	(0.227)	(0.538)	(0.723)	(0.770)
$IndirectTariff_{USA}$	-1.3024	-1.5888	2.1064	3.9969	-0.0307	8.843
	(2.283)	(6.020)	(7.100)	(8.874)	(13.040)	(10.838)
$IndirectTariff_{CHN}$	0.0458**	0.2015***	0.3021***	0.2890**	0.4754***	0.7212***
	(0.021)	(0.063)	(0.067)	(0.098)	(0.121)	(0.145)
MarketCap	0.0001	0.0006***	0.0008***	0.0008**	0.0009**	0.0007
	(0.00005)	(0.0002)	(0.0002)	(0.0003)	(0.0004)	(0.001)
Constant	0.0006	-0.0033*	-0.0138***	-0.0380***	-0.0428***	-0.0530***
	(0.002)	(0.002)	(0.003)	(0.005)	(0.006)	(0.006)
Other tariff controls	Yes	Yes	Yes	Yes	Yes	Yes
Sector-event-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country(Territory)-event-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	300,818	300,818	300,818	300,818	300,818	300,818
R-squared	0.044	0.043	0.042	0.038	0.036	0.038

Notes: This table reports the estimation results of the second-step model for firms in sectors A-D only. White (1980) robust standard errors adjusted for heteroskedasticity and WIOD-industry-level clustering are in parentheses. Coefficient estimates significantly different from zero at 10%, 5%, and 1% levels are marked *, **, and ***, respectively.

Table 7. Second-step regressions for U.S. firms with a constant pre-"trade-war" estimation-time window

Variables	(0,0)	(-1,+1)	(-1,+3)	(-1,+5)	(-1,+7)	(-1,+10)
$\text{DirectTariff}_{\text{USA,USA}}$	-0.2979	-1.1671	-2.6643*	-3.7687**	-4.3035**	-6.4308**
	(0.256)	(0.775)	(1.370)	(1.627)	(2.037)	(2.931)
$\text{DirectTariff}_{\text{USA,CHN}}$	-0.012	-0.0633	-0.1349	-0.1737	-0.1618	-0.2824
	(0.025)	(0.065)	(0.129)	(0.149)	(0.184)	(0.251)
$\text{DirectTariff}_{\text{CHN,CHN}}$	-0.0015	0.0187**	0.0331**	0.0008	-0.0019	0.0135
	(0.003)	(0.008)	(0.013)	(0.016)	(0.020)	(0.026)
$\text{DirectTariff}_{\text{CHN,USA}}$	-0.2904	-1.8569***	-2.8390***	-4.5841***	-5.5081***	-7.1069***
	(0.202)	(0.480)	(0.842)	(0.950)	(1.157)	(1.726)
$\text{IndirectTariff}_{\text{USA}}$	1.6841	7.1327	15.7492	17.4501	17.6584	31.7601
	(4.030)	(10.852)	(21.388)	(25.091)	(30.996)	(42.301)
$\text{IndirectTariff}_{\text{CHN}}$	-0.0367*	-0.0333	-0.0673	-0.1955*	-0.1261	-0.0582
	(0.018)	(0.054)	(0.082)	(0.100)	(0.125)	(0.163)
MarketCap	0.0004***	0.0018***	0.0029***	0.0037***	0.0049***	0.0063***
	(0.0001)	(0.0002)	(0.0002)	(0.0004)	(0.001)	(0.001)
Constant	-0.0018	-0.0201***	-0.0324***	-0.0407***	-0.0529***	-0.0628***
	(0.001)	(0.003)	(0.003)	(0.004)	(0.004)	(0.006)
Other tariff controls	Yes	Yes	Yes	Yes	Yes	Yes
Sector-event-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country(Territory)-event-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	551,273	551,273	551,273	551,273	551,273	551,273
R-squared	0.039	0.037	0.034	0.028	0.026	0.026

Notes: This table reports the estimation results of the second-step model with a fixed first-step estimation window of 250 days during 2017 for all stocks in the data. White (1980) robust standard errors adjusted for heteroskedasticity and WIOD-industry-level clustering are in parentheses. Coefficient estimates significantly different from zero at 10%, 5%, and 1% levels are marked *, **, and ***, respectively.

Table 8. Summary statistics of sector-based coefficients

Panel A. All coefficients.

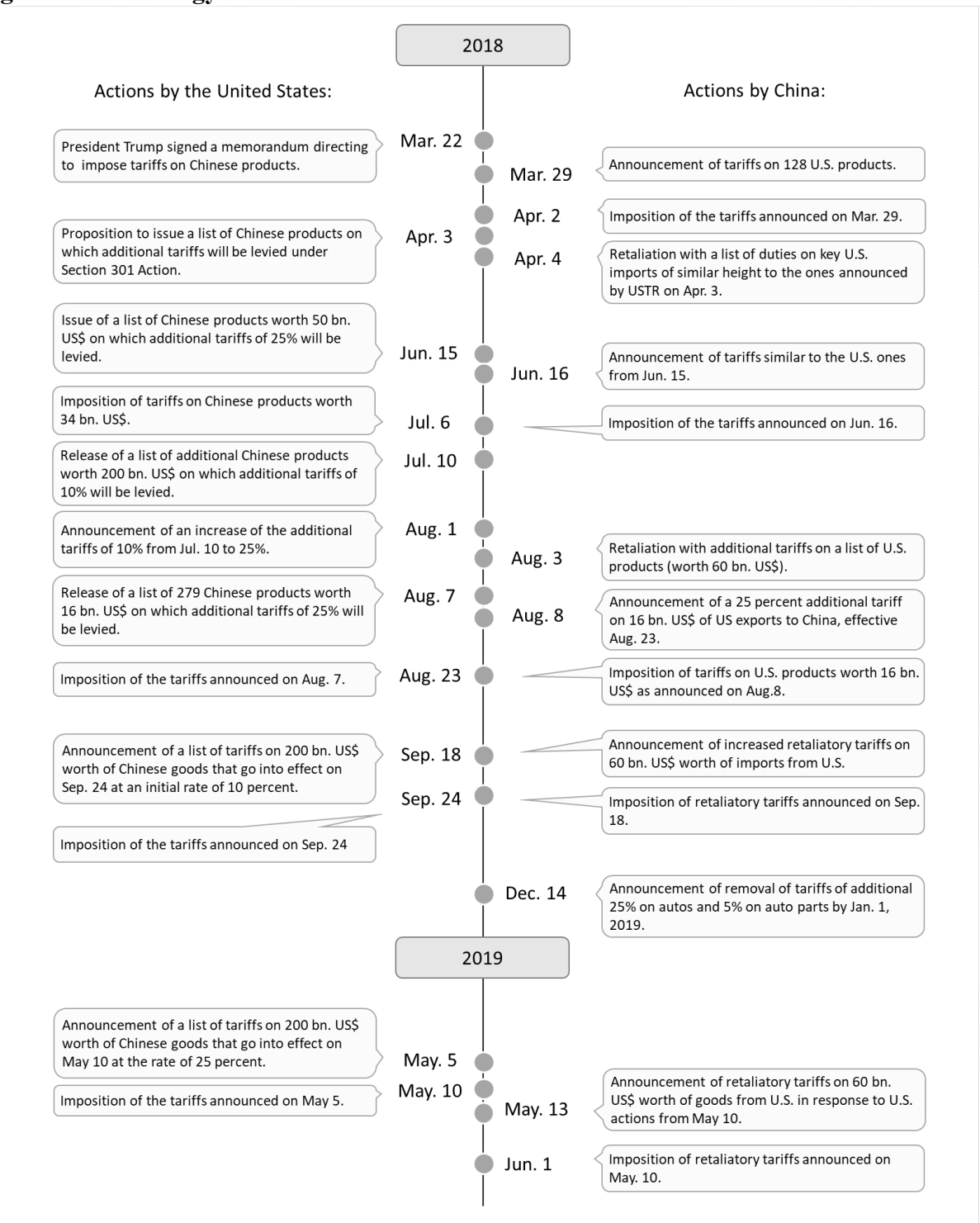
Window	Explanatory Variable	No. of coeff.	Min	P25	P50	P75	Max
(0,0)	$DirectTariff_{USA,USA}$	30	-32.59	-5.32	-0.01	7.07	55.03
	$DirectTariff_{USA,CHN}$	30	-46.97	-9.30	-1.68	2.77	13.98
	$DirectTariff_{CHN,CHN}$	30	-11.40	-5.55	-1.51	2.01	11.08
	$DirectTariff_{CHN,USA}$	30	-23.85	-0.57	1.48	8.53	104.84
	$IndirectTariff_{USA}$	30	-266.84	-23.99	-1.00	25.15	464.83
	$IndirectTariff_{CHN}$	30	-140.23	-33.25	-7.54	8.25	156.62
(-1,+1)	$DirectTariff_{USA,USA}$	30	-187.45	-23.16	-0.88	13.88	85.19
	$DirectTariff_{USA,CHN}$	30	-98.09	-22.77	-8.39	4.84	34.45
	$DirectTariff_{CHN,CHN}$	30	-33.63	-11.01	-2.37	0.25	23.32
	$DirectTariff_{CHN,USA}$	30	-127.79	-1.54	4.28	19.55	154.42
	$IndirectTariff_{USA}$	30	-1122.03	-149.96	-21.01	83.38	1244.06
	$IndirectTariff_{CHN}$	30	-271.39	-92.99	-31.49	44.07	362.52
(-1,+3)	$DirectTariff_{USA,USA}$	30	-147.49	-17.44	-1.48	19.03	209.60
	$DirectTariff_{USA,CHN}$	30	-138.33	-30.17	-7.10	7.78	66.36
	$DirectTariff_{CHN,CHN}$	30	-65.41	-18.95	-6.31	2.33	28.83
	$DirectTariff_{CHN,USA}$	30	-198.84	-2.19	13.00	39.67	156.17
	$IndirectTariff_{USA}$	30	-1249.12	-174.29	2.11	58.67	1241.54
	$IndirectTariff_{CHN}$	30	-364.84	-189.94	-73.61	63.10	618.08
(-1,+5)	$DirectTariff_{USA,USA}$	30	-180.96	-29.68	-0.31	24.42	275.58
	$DirectTariff_{USA,CHN}$	30	-185.96	-41.73	-5.72	7.54	68.80
	$DirectTariff_{CHN,CHN}$	30	-94.45	-18.41	-6.48	0.66	47.11
	$DirectTariff_{CHN,USA}$	30	-168.15	-24.32	11.06	39.68	164.00
	$IndirectTariff_{USA}$	30	-1680.76	-214.01	-4.19	77.03	1708.54
	$IndirectTariff_{CHN}$	30	-469.05	-219.35	-74.19	71.79	731.44
(-1,+7)	$DirectTariff_{USA,USA}$	30	-176.95	-31.12	0.29	41.14	211.70
	$DirectTariff_{USA,CHN}$	30	-221.50	-52.04	-2.75	13.22	117.06
	$DirectTariff_{CHN,CHN}$	30	-96.92	-23.52	-10.20	-0.03	36.06
	$DirectTariff_{CHN,USA}$	30	-151.86	-23.54	15.00	57.25	232.24
	$IndirectTariff_{USA}$	30	-1460.79	-278.30	25.88	176.08	1767.43
	$IndirectTariff_{CHN}$	30	-586.72	-270.20	-78.98	98.58	876.21
(-1,+10)	$DirectTariff_{USA,USA}$	30	-542.33	-29.91	0.97	61.92	442.34
	$DirectTariff_{USA,CHN}$	30	-309.21	-55.28	0.20	19.55	119.62
	$DirectTariff_{CHN,CHN}$	30	-113.16	-31.76	-15.25	0.90	38.28
	$DirectTariff_{CHN,USA}$	30	-173.40	-16.09	8.46	78.47	422.00
	$IndirectTariff_{USA}$	30	-869.13	-263.03	26.84	243.98	1979.26
	$IndirectTariff_{CHN}$	30	-766.33	-338.24	-37.68	131.61	1046.07

Panel B. Statistically significant coefficients only.

Window	Explanatory Variable	No. of coeff.	Min	P25	P50	P75	Max
(0,0)	$DirectTariff_{USA,USA}$	2	-16.38	-16.38	-13.04	-9.70	-9.70
	$DirectTariff_{USA,CHN}$	14	-46.97	-21.36	-11.93	-5.48	13.98
	$DirectTariff_{CHN,CHN}$	4	-10.08	-7.80	-3.71	4.60	11.08
	$DirectTariff_{CHN,USA}$	6	8.37	8.51	25.38	48.28	104.84
	$IndirectTariff_{USA}$	6	-266.84	-92.35	39.38	300.41	464.83
	$IndirectTariff_{CHN}$	7	-140.23	-61.73	-41.91	8.25	156.62
(-1,+1)	$DirectTariff_{USA,USA}$	1	-24.39	-24.39	-24.39	-24.39	-24.39
	$DirectTariff_{USA,CHN}$	15	-98.09	-40.38	-22.77	-11.71	30.58
	$DirectTariff_{CHN,CHN}$	4	-30.30	-29.08	-20.28	0.11	12.92
	$DirectTariff_{CHN,USA}$	5	-127.79	-46.89	-1.54	16.27	110.26
	$IndirectTariff_{USA}$	11	-1122.03	-282.39	-45.14	83.38	1244.06
	$IndirectTariff_{CHN}$	13	-271.39	-132.99	-87.53	112.28	362.52
(-1,+3)	$DirectTariff_{USA,USA}$	1	-2.90	-2.90	-2.90	-2.90	-2.90
	$DirectTariff_{USA,CHN}$	15	-138.33	-54.98	-30.17	17.36	53.02
	$DirectTariff_{CHN,CHN}$	3	-65.41	-65.41	-31.21	-27.06	-27.06
	$DirectTariff_{CHN,USA}$	4	-140.93	-102.83	-33.46	33.68	69.54
	$IndirectTariff_{USA}$	10	-852.28	-390.87	-119.02	134.42	1241.54
	$IndirectTariff_{CHN}$	17	-364.84	-219.51	-114.58	24.19	618.08
(-1,+5)	$DirectTariff_{USA,USA}$	3	-29.68	-29.68	-4.22	83.79	83.79
	$DirectTariff_{USA,CHN}$	14	-185.96	-65.20	-32.76	2.90	68.15
	$DirectTariff_{CHN,CHN}$	5	-94.45	-20.85	-18.41	-12.78	-0.02
	$DirectTariff_{CHN,USA}$	5	-168.15	-73.67	-4.11	32.20	118.81
	$IndirectTariff_{USA}$	11	-1047.39	-511.10	30.41	234.23	1708.54
	$IndirectTariff_{CHN}$	17	-469.05	-275.01	-155.34	47.22	731.44
(-1,+7)	$DirectTariff_{USA,USA}$	3	-4.67	-4.67	40.40	106.38	106.38
	$DirectTariff_{USA,CHN}$	14	-221.50	-74.26	-38.72	4.77	84.45
	$DirectTariff_{CHN,CHN}$	4	-96.92	-57.00	-8.56	13.08	26.20
	$DirectTariff_{CHN,USA}$	2	-98.82	-98.82	-51.83	-4.84	-4.84
	$IndirectTariff_{USA}$	10	-1460.79	-675.07	-32.79	326.52	1767.43
	$IndirectTariff_{CHN}$	18	-586.72	-325.61	-171.12	60.04	876.21
(-1,+10)	$DirectTariff_{USA,USA}$	3	-58.80	-58.80	-6.01	176.76	176.76
	$DirectTariff_{USA,CHN}$	14	-309.21	-101.08	-66.40	5.48	119.62
	$DirectTariff_{CHN,CHN}$	3	-113.16	-113.16	-25.38	-0.03	-0.03
	$DirectTariff_{CHN,USA}$	4	-130.47	-67.99	19.85	111.51	177.81
	$IndirectTariff_{USA}$	7	-819.68	-739.58	58.03	497.70	1979.26
	$IndirectTariff_{CHN}$	18	-766.33	-386.11	-247.45	90.81	1046.07

Notes: This table reports the summary statistics of the coefficients on the direct and indirect tariffs for WIOD-sector-based regressions. Panel A reports summary statistics of all the coefficients, while Panel B reports summary statistics of the statistically significant coefficients (at least at 10%) only.

Figure 1. Chronology of the U.S. China "Trade War"



Notes: This figure contains all the dates of the U.S.-China trade between March 29, 2018, and June 1, 2019, but it excludes dates of other tariff actions such as the tariffs on steel and aluminum implemented by the U.S. and other actions, if those were not explicitly targeting Chinese products only. The dates of the United States are measured in U.S. (Washington, DC) time and those of China are measured in Chinese time.

Figure 2. Firm frequency across countries and territories in the data

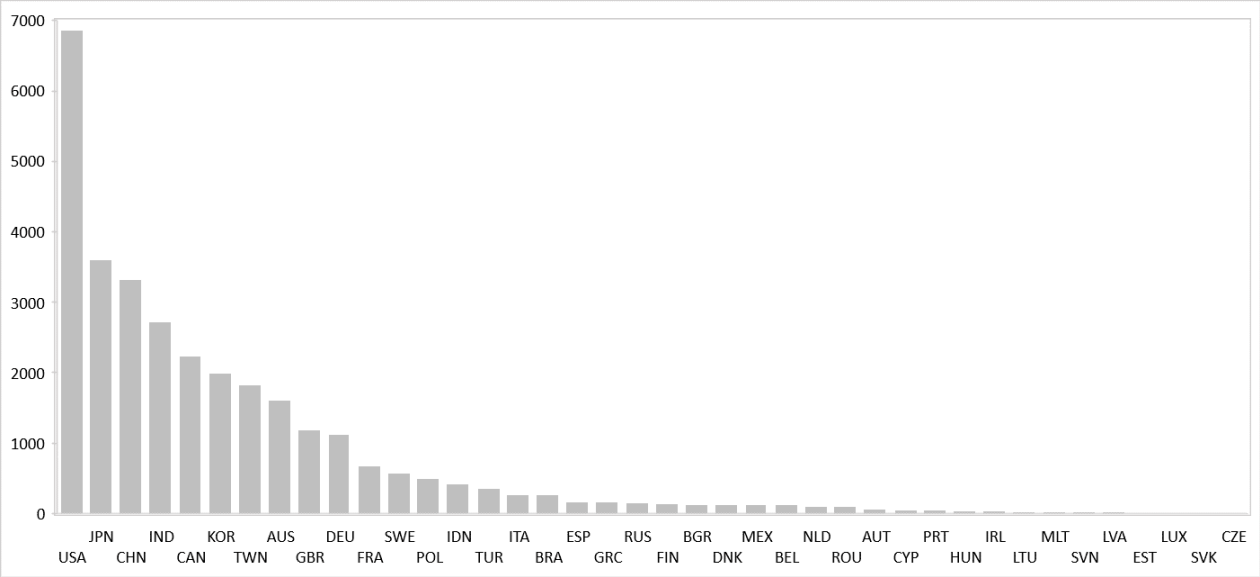
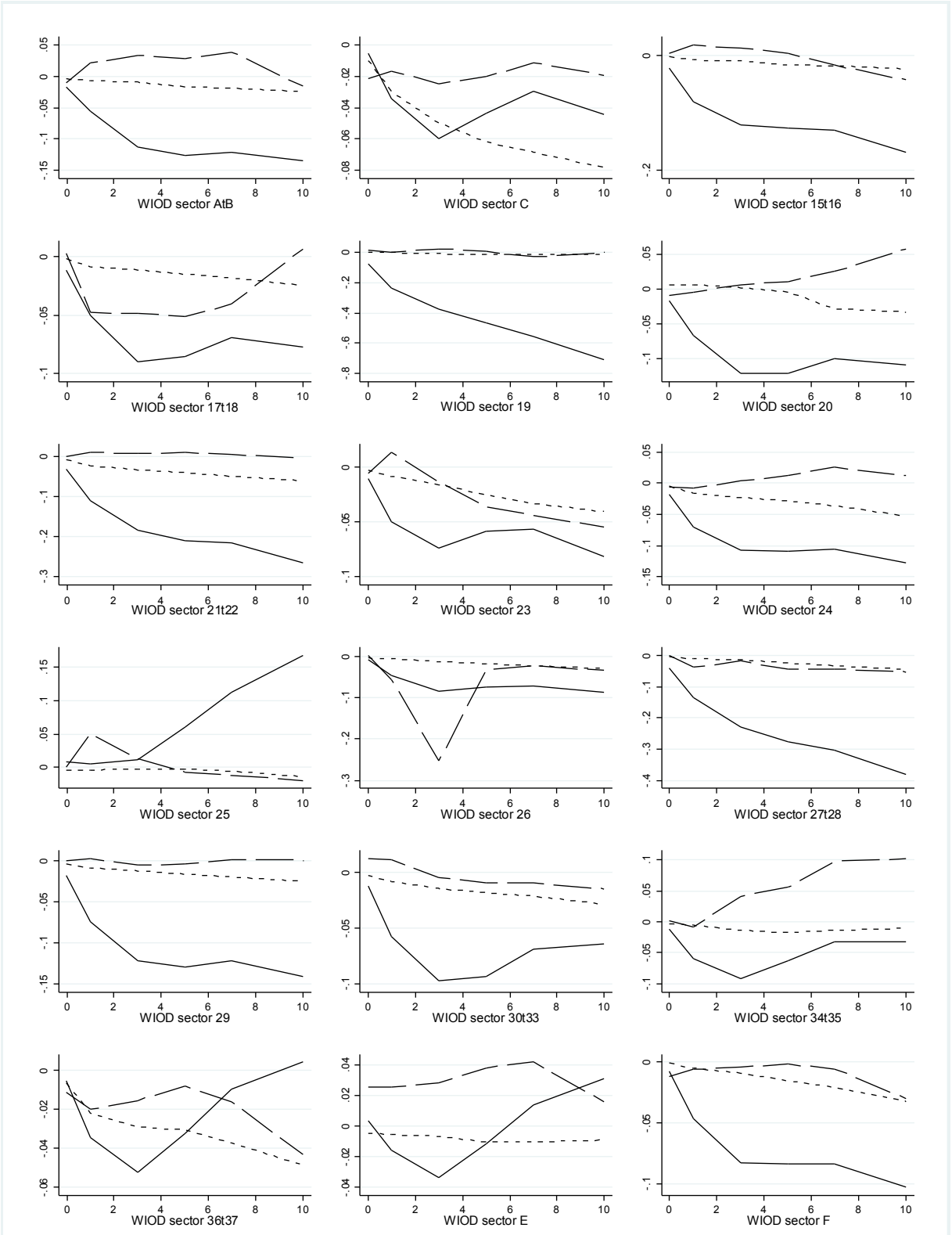
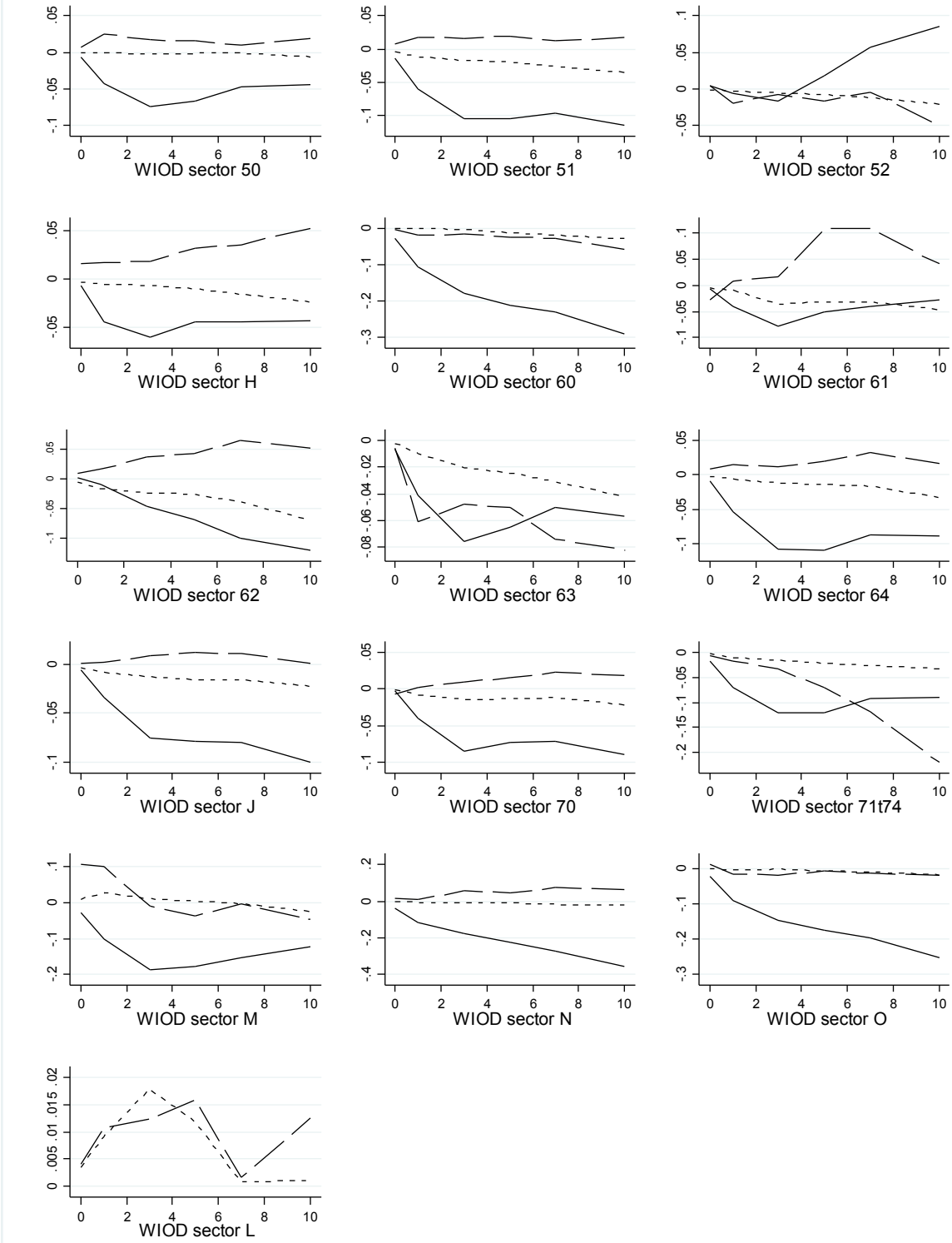


Figure 3. Average CARs after the event on June 15, 2018





Notes: The long-dashed, short-dashed, and solid lines represent average CARs within the event window for U.S. firms, the Rest-country(territory) firms, and the Chinese firms in the corresponding WIOD industry, respectively.