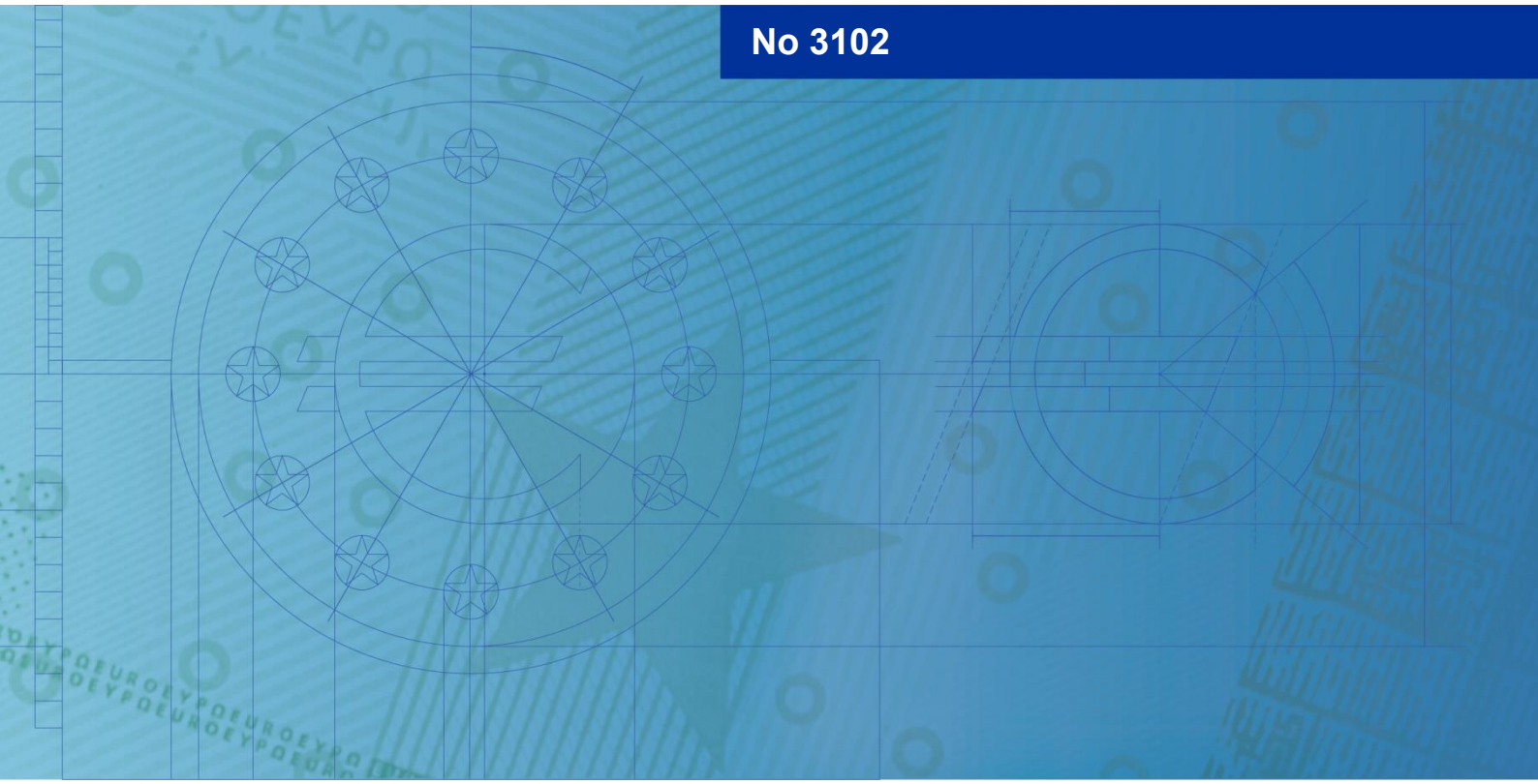
EUROPEAN CENTRAL BANK
EUROSYSTEM

Working Paper Series

Alica Ida Bonk, Chloe Larkou

The macroeconomic impact of trade policy: a new identification approach

No 3102



Disclaimer: This paper should not be reported as representing the views of the European Central Bank (ECB). The views expressed are those of the authors and do not necessarily reflect those of the ECB.

Abstract

This paper examines the effects of trade policy shocks on the US economy using a novel identification strategy that combines narrative information with stock market data. We construct a new dataset of daily trade policy statements from 2007 to 2019, enabling us to capture a broad range of policy actions. By analyzing stock price reactions of trade-exposed and non-trade-exposed firms around these statements, we identify unanticipated trade policy shocks. Using the local projections method, we assess asymmetries and non-linearities based on the sign and size of shocks. We find that the economic effects of trade liberalizations and protectionism are symmetric, with no evidence of non-linearities. However, foreign-initiated trade shocks have a larger impact than US-initiated ones, and policy implementations have a stronger effect than announcements alone. Finally, we explore whether relying on President Trump's trade-related tweets, rather than official statements, alters the estimated effects.

Keywords: Tariffs; Protectionism; Trade liberalization; Stock market

JEL Codes: F10, F13, F14, G12, G14

Non-technical summary

Recent years have seen a resurgence of trade policy as a central issue in macroeconomics. Uncertainty about tariffs, trade agreements, and retaliatory measures, particularly following the United States' adoption of protectionist policies under the Trump administration, has raised concerns about its potential to disrupt investment, production, and employment. While the long-term benefits of trade liberalisation are well established, the short- and medium-term effects of both liberalising and protectionist policies remain uncertain and difficult to measure. This paper proposes a new methodology to measure unexpected trade policy changes and estimates their effects on key macroeconomic variables in the United States between 2007 and 2019. Understanding how economies respond to trade policies is critical for policymakers seeking to assess external risks and support informed economic decisions.

In this paper, we construct a novel dataset of daily official trade policy statements issued by the US government and its main trading partners from 2007 to 2019. These statements cover a wide range of policy changes, from tariff increases to new trade agreements. To identify the economic impact of unexpected trade policy news, the paper examines how the stock prices of firms that are highly exposed to international trade react to these announcements, compared to those of more domestically focused firms. If the announcement is truly unanticipated, financial markets are expected to react immediately. By tracking the differential reaction of these stock prices, we are able to determine whether a policy change was perceived as protectionist or liberalising, and quantify its economic relevance. We then assess the macroeconomic effects of these shocks by estimating how variables such as industrial production, exports, and employment respond over time.

The analysis reveals several key findings. First, liberalising trade, by reducing tariffs or easing other trade barriers, leads to increased industrial

production, trade volumes, and business investment. Protectionist measures, including tariffs, have equally large effects in the opposite direction. The responses are symmetric, meaning that the economic losses from protectionism are equal in size (but opposite in sign) to the gains from liberalisation. Second, policy implementations have stronger effects than mere announcements. Firms and households appear to adopt a cautious "wait and see" approach in response to announced but not yet implemented policies, highlighting the role of uncertainty in shaping economic behaviour. Finally, comparing the effects of a trade policy initiated by the US to one caused by trade partners, it appears that the latter has more significant effects on the US economy. This suggests that potential retaliatory actions from US trade partners could have detrimental effects on the US economy, and especially firm investment.

Another important finding is that the effects of trade policy are non-linear. Large shocks, whether liberalising or protectionist, lead to disproportionately larger changes in economic activity. This non-linearity implies that abrupt or broader-based changes in trade policy can trigger more severe economic disruptions than smaller adjustments. We also explore the role of communication channels and find that informal or less credible announcements, such as President Trump's tweets, are associated with more subdued, and at times, contradictory macroeconomic reactions. This highlights the importance of credible and transparent communication in shaping economic expectations.

Our findings can be valuable for policymakers seeking to make informed decisions about the short and medium-term impact of trade policies on the macroeconomy. For instance, as the new Trump administration introduces new tariffs against almost all trading partners with the aim of boosting US manufacturing and addressing trade imbalances, it is imperative to understand the overall impact on the US economy, as protectionist measures appear to negatively affect industrial production, trade, firm investment, and lead to increased unemployment. Furthermore, the costs of protectionism can be substantial, especially when foreign retaliation is likely.

1 Introduction

While the long-term benefits of free trade are widely accepted by economists, the short- and medium-term effects of trade policy shifts, especially toward protectionism, remain debated. This uncertainty stems both from the rarity of major protectionist measures in the postwar period and from the challenge of isolating unanticipated policy changes, which are often preceded by protracted negotiations and public signaling.

Recent developments have brought renewed attention to the macroeconomic impact of protectionist policies. In April 2025, President Trump announced a sweeping new set of tariffs, including a 10% "baseline" tariff on all imported goods and higher reciprocal tariffs targeting countries with large trade surpluses. While these measures are too recent to fully assess their macroeconomic impact, they highlight the importance of understanding the economic consequences of trade policy shifts. To this end, we analyze data from 2007 to 2019, a period that includes the Trump administration's earlier tariff actions, such as the 25% steel duties introduced in 2018. The protectionist policies implemented during Trump's first and second terms share common goals - reviving US manufacturing and addressing trade imbalances - yet their true macroeconomic effects remain uncertain and controversial.

In this paper, we aim to contribute to the current debate and to address the empirical challenges associated with identifying trade policy shocks. In particular, we seek to answer the following question: What are the short- and medium-term effects of both liberalizing and protectionist trade policies on macroeconomic variables? Therefore, our study goes beyond protectionist policies and also examines the effects of trade liberalization. Evaluating both tightening and loosening trade policies within the same empirical framework, allows us to assess the macroeconomic consequences of the full spectrum of trade policy instruments. To do so, we introduce a novel data set that includes daily official trade policy statements issued by the United States and its trading

partners between 2007 and 2019, covering policy changes in both directions. We argue that this narrative approach can be combined with stock market data to identify unanticipated trade policy shocks.

We find that industrial production, exports, imports, and commercial loans increase following a liberalizing shock and similarly decline after a protectionist shock. The gains from trade liberalizations and the damage from protectionism are of equal magnitude in absolute terms, with no non-linearities observed along this dimension.

On the other hand, responses vary depending on the type of trade policy shock. We find that implementation tends to elicit a stronger, more significant response than announcements. Being uncertain about whether policymakers will follow through with planned trade policy changes, firms and households seem to adopt a "wait and see" approach. Moreover, a trade shock initiated by the US has less significant effects compared to one caused by trade partners. Our results point to potentially detrimental effects of foreign retaliations on firm investment, employment, and consumption. We estimate that the implementation of retaliatory tariffs, such as by the EU in June 2018, decreased US firm investment by -0.9% to -4.6% on impact. These results take on added significance in light of President Trump's April 2025 tariff announcement, which has already sparked threats of retaliation from major trading partners. Finally, our analysis of non-linearities reveals that this could be a conservative estimate since firm investment is affected disproportionately by large trade policy shocks.

These results are highly robust to different monthly shock aggregations, to grouping stock prices based on different definitions of trade exposure (i.e. import dependency), and to controlling for other macroeconomic news. In an extension, we show that the reactions of industrial production and firm investment were less pronounced under the Trump administration compared to the rest of the sample. This diminished reaction can be attributed to the unpredictable nature of statements made during his presidency, characterized by frequent amendments and revocations, which likely heightened uncertainty

and dampened their impact. Furthermore, substituting Trump's tweets for official trade policy statements results in more subdued, and at times, contradictory macroeconomic reactions. This result can likely be attributed to the tweets' lower credibility and their lack of specificity.

Our contribution to the existing literature is threefold. First, we present a new data set containing daily official trade policy statements by the United States and its trade partners covering periods of striving towards trade liberalization as well as the abrupt shift towards protectionism in 2018/19. This data set provides richer information than previously used sources such as Google Trends (Amiti et al. (2020)). Thus, we can distinguish between pure announcements and implementations and account for differential effects depending on the initiating country. Moreover, we capture changes in non-tariff barriers, an important component of trade agreements.

Second, we propose a novel identification strategy that complements the data set with information contained in stock prices. More specifically, on days with trade-related statements, we observe price movements of two stock baskets that differentiate firms by exposure to trade policy based on their propensity to export. Apart from allowing for a more accurate categorization of liberalizing and protectionist shocks, this high-frequency approach enables us to extract and quantify the unanticipated and exogenous component of trade policy actions.

Our identification strategy brings together three strands of the literature: research using a narrative approach to identify macroeconomic shocks, papers pointing at policy news as a major source of equity market movements (e.g., Baker et al. (2019), Moser and Rose (2014)), and analyses exploiting firm-level differences in policy exposure (e.g. Fisher and Peters (2010), Baker et al. (2016)).

Trade policy shocks are identified whenever a trade policy statement was issued by a US or foreign government entity, and two additional conditions hold. Both the stock price of trade-exposed firms and the ratio of trade-exposed

and non-trade-exposed firms need to move in the same direction. Hence, we require that internationally active firms are relatively more affected, which is a well-documented fact (see Greenland et al. (2024) and Huang et al. (2019)), that we validate ex-ante using our data set. Both the stock price of trade-exposed firms and the ratio of trade-exposed to non-trade-exposed firms must move in the same direction. To minimize subjectivity, we adopt an ex-ante agnostic stance regarding the direction of policy changes, relying instead on stock price movements to determine the sign of the shock. Our analysis demonstrates that stock prices effectively capture significant trade policy shifts, enabling us to quantify the magnitude of shocks. Furthermore, we provide robust evidence that the identified shocks remain uncontaminated by other macroeconomic shocks, as well as the current, past, or expected future economic conditions or uncertainties. Notably, our shocks exhibit considerable predictive power for the trade policy uncertainty index developed by Baker et al. (2016). Moreover, we find that combining stock price movements with a narrative approach is crucial for ensuring the exogeneity of the shocks.

Our last contribution is based on using the local projections strategy proposed by Jordà (2005), which allows us to analyze asymmetric responses of monthly output, investment, and trade to liberalizing and protectionist shocks. In addition, we can detect non-linearities in shock size and compare responses to shocks caused by the US and its trade partners.

The rest of the paper is structured as follows. Section 2 provides an overview of the existing literature, while section 3 introduces the data. Subsequently, section 4 describes our empirical strategy and section 5 the results. We present sensitivity analysis and extensions in section 6. Finally, section 7 concludes.

2 Literature

Our work relates to three strands of the literature: research investigating the effects of trade policy shocks, studies highlighting the implications of policy news on equity markets, and analyses exploiting firm-level differences in policy exposure.

Within the literature on trade policy shocks, a number of studies have motivated our work. Barattieri et al. (2021), for example, investigate the effects of tariffs on short-term macroeconomic fluctuations using anti-dumping investigations. Complementing this identification approach with input-output tables, Barattieri and Cacciatore (2023) find ambiguous employment effects of anti-dumping and countervailing duties. This motivates our further study of the macroeconomic consequences of trade policies, aiming to capture both tariff and non-tariff barriers in order to assess the comprehensive impact of reforms.

Furthermore, Waugh (2020) explores the impact of trade shocks by focusing on US counties' exposure to Chinese retaliatory tariffs during the 2017-2018 trade war. He finds significant employment effects already before tariffs are implemented. Based on this observation, our identification strategy distinguishes between announcements and implementations and analyzes both domestically-originated and foreign-induced trade shocks.

Several other papers investigate the effect of the 2018 trade war on traded goods' quantities and prices. For example, using an event study, Fajgelbaum et al. (2020) find a significant decrease in targeted imports and exports and a full pass-through to import prices after a tariff increase. Similarly, Amiti et al. (2019) analyze firm-level customs data and find an immediate increase in US prices due to tariffs, primarily affecting US consumers rather than foreign exporters.

Trade policies may also have indirect effects through uncertainty. Caldara et al. (2020) show that increased uncertainty reduces investment and activity

both at micro and aggregate levels. Moreover, Handley and Limão (2017) find that China's WTO accession in 2001, by reducing the threat of a US-China trade war, led to increased US imports from China, lower prices, and higher consumer incomes. However, Alessandria et al. (2024) suggest that pure uncertainty has minimal impact, but expectations of future tariff increases encourage front-loading of trade. Their study emphasizes the significant influence of anticipation effects and motivates our focus on isolating unexpected policy changes. Unlike our paper, Alessandria et al. (2024) do not specifically examine unanticipated policy shocks, as the vote to renew China's MFN status represented a potential tariff change whose size and timing were known. Similarly, Metiu (2021) study the effect of U.S. trade policy announcement shocks. They find that announced but not yet imposed trade restrictions lead to output and investment contractions in major trading partners, further emphasizing the role of expectations in trade policy.

Boer et al. (2023) contribute to this discussion by estimating the macroeconomic effects of import tariffs and trade policy uncertainty in the US. Combining theory-consistent and narrative sign restrictions in Bayesian SVARs, they find that tariff shocks have more pronounced and persistent negative effects on trade, investment, and output than trade policy uncertainty shocks. Their findings suggest that undoing the 2018/19 protectionist measures could raise output by 4% over three years, highlighting the substantial costs of protectionism and the importance of distinguishing between different components of trade policy shocks.

Our identification approach is related to the literature on policy news and its impact on the stock market. For example, Moser and Rose (2014) demonstrate the significant influence of news related to regional trade agreements on national stock market indices. Similarly, Boer and Rieth (2024) find that restrictive US trade policy shocks affect US stock prices negatively and the effects persist for several weeks or quarters. They find that trade policy uncertainty shocks dominate the tariff level effects. Additionally, Baker

et al. (2019) construct an Equity-Market-Volatility index based on newspaper data, showing that policy news, including trade-related news, drives stock market fluctuations. Furthermore, Egger and Zhu (2019) analyze stock market reactions during the US-China trade war, finding effects on stock prices in both target and home countries. The research by Pástor and Veronesi (2013) confirms that government policies impact risk premia and stock prices, providing a basis for utilizing stock prices as indicators of reactions to trade news.

Our approach also builds on studies that analyze how policy news affects firms with different levels of policy exposure. For example, according to Huang et al. (2019), firms highly reliant on trade with China experienced lower stock returns and increased default risks following President Trump's proposed tariffs. Similar conclusions are reached using Google Trends to identify key trade war events Amiti et al. (2020). Baker et al. (2016) demonstrate that firms with greater exposure to government purchases have higher stock price volatility during periods of fiscal policy uncertainty. Wagner et al. (2018), Davis and Seminario (2019), Hassan et al. (2019) and Hassan et al. (2024) provide additional evidence on the firm-specific impact of policy risk. These papers provide the underpinning for our shock identification which relies on the fact that differences in firms' trade exposure are reflected in stock prices.

Our paper contributes to the existing literature by examining the short- and medium-term effects of trade policy shocks on the macroeconomy. We combine a narrative approach with stock returns to identify unanticipated trade policy shocks, capturing both tariff and non-tariff barriers. Our novel data set allows us to shed light on a wide range of previously overlooked asymmetries. In particular, we differentiate between the effects of protectionist and liberalizing trade policy shocks, as well as those initiated by the US versus its trading partners. We also distinguish between policy announcements and their subsequent implementation. In addition, we uncover non-linearities in the magnitude of shocks and highlight differences across trade policy

communication channels. Thus, our findings provide a more comprehensive understanding of the heterogeneous effects of trade policies.

3 Data

Our paper relies mainly on three types of data: trade policy statements, stock price data, and macroeconomic variables. This section describes each of these in turn and appendix A summarizes our sources.

3.1 Official trade policy statements

To identify trade policy shocks, we construct a new data set using official trade policy statements issued by the US and its trade partners. Statements are recorded for every day starting on 1 January 2007 and ending on 31 December 2019. We end the estimation sample before the Covid-19 pandemic due to the potential distortions it may introduce, making it challenging to separate the effects of trade policies from those of the pandemic. Our primary source of information on trade policy is the Office of the US Trade Representative (USTR), the government agency entrusted with the development of trade policies, advising the president, and overseeing trade negotiations. USTR statements are complemented by publications of other US Executive Branches, such as the White House, the Department of Commerce, and the International Trade Commission.[1] Additionally, newspaper articles from Bloomberg, the Financial Times, and Reuters are consulted in case they precede official statements or provide complementary information.[2] Information on trade partners' policy actions towards the US is mostly taken from press releases of the USTR but is supplemented with the respective national sources (e.g. the Chinese Ministry of Commerce).

[1] Additional sources include the Departments of State and Agriculture, the US Customs and Border Protection, the Federal Register and the Department of the Treasury

[2] Statements made during Trump's presidency are also cross-checked with piie.com and shenglufashion.com

Statements are classified into "major" and "minor" based on the importance of the information released. The former category is assigned if **either** one of the major US trade partners (Canada, Mexico, China, the EU, Korea, Japan or the UK) **or** a group of at least five trade partners is involved **and** if a large amount of goods is affected by a drastic change in trade policy, for example through tariffs or a trade agreement. Although the data set provides information on whether the announced policy is presumably trade liberalizing (i.e. implying lower barriers to trade) or protectionist, we do not make use of this classification when constructing our baseline shock. Data entries are further categorized into "announcements", notifying the public of potential future policy changes, and "implementations", marking the day on which policies are formally approved (e.g. signing of trade agreements) or go into effect. Moreover, we record whether or not the policy was initiated by a trade partner (e.g. tariff retaliations). This detailed categorization allows us to study the effect of different types of trade policy shocks and explore the relevance of uncertainty that is inherent in pure announcements. Out of the 3262 working days in our sample, trade policy statements have occurred on 848 days. On 104 of these days, "major" proclamations were made, which we will use in this paper. 16 of these days contain statements issued unilaterally by trade partners without any dissemination of trade policy by the US. Moreover, 30% of the major entries refer to policy implementations, and the rest to announcements.

Figure 1 depicts the number of major protectionist and liberalizing statements per month, while the figure in appendix B.1 also shows minor statements. The shift from a relatively liberal trade policy stance under Bush and Obama towards a protectionist stance under Trump is clearly visible. A timeline of selected major trade policy statements can be found in appendix C.

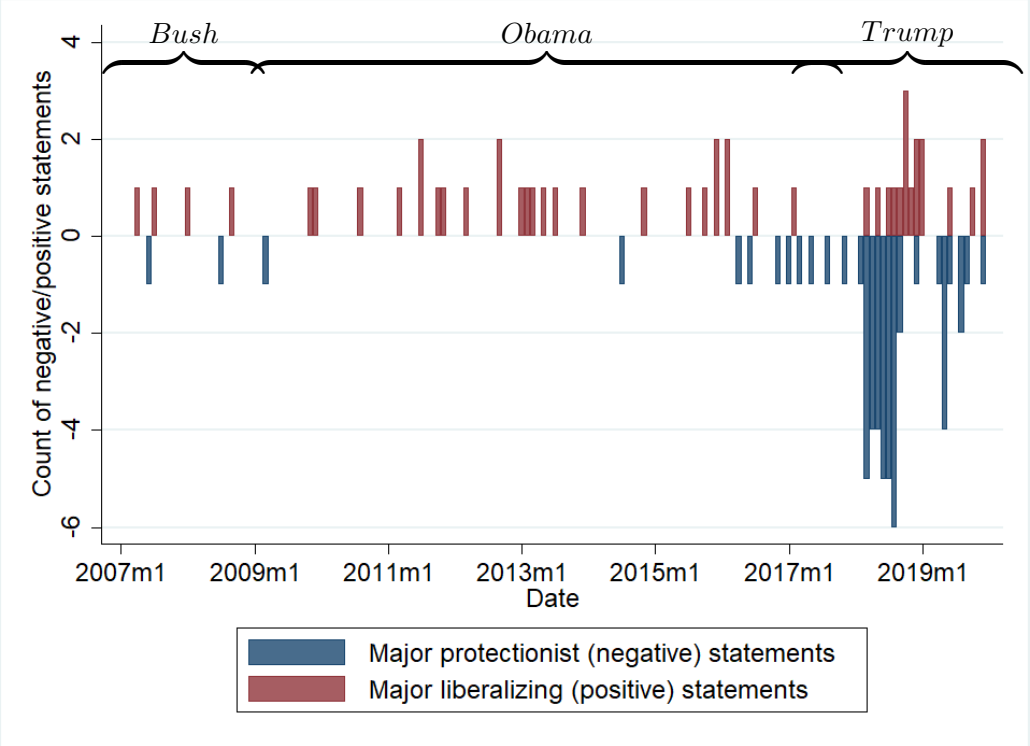


Figure 1: Number of **major** trade policy statements by sign, aggregated to the monthly frequency.

3.2 Stock market data

The second building block of our analysis is daily stock market data.[3] Specifically, we use two stock baskets constructed by Goldman Sachs and provided by Bloomberg. On the one hand, we use their "International Sales basket", which constructs a stock market index based on the 50 S&P 500 companies with the highest international sales share (henceforth "exporters"). These firms should be particularly affected by trade policy changes. According to Bloomberg, the international portfolio contains companies from 11 different

[3]To verify robustness, we would have liked to use a more high-frequency identification scheme but such stock market data was not accessible to us. Besides, we only know the day but not the exact time at which trade policy statements were issued. Furthermore, Wagner et al. (2018) have documented the time lag with which the stock market responds to trade policy changes. This stands in contrast to monetary policy decisions for which the planned time of announcement is roughly known ex-ante and hence investors may react more quickly to policy changes.

sectors, encompassing both manufacturing and services.[4] The median firm derives 71% of its revenues from abroad compared with 27% for the median S&P 500 company. On the other hand, we rely on the "Domestic sales basket", based on the 50 S&P 500 stocks with the highest domestic revenue exposure, which should be least affected by trade policy. The median firm in this basket generates 100% of its revenues domestically, whereas, for the median S&P 500 company, the share is 73%. Appendix D reports examples of firms that make up each basket. The evolution of both stock price indices as well as their ratio, is depicted in figure 5.

To ensure that our results also hold when using an alternative definition of trade exposure, we build our own importer stock price index. This is done by using the Hoberg-Moon Offshoring data set (Hoberg and Moon (2017)), which records the frequency of firms mentioning the purchase of inputs from abroad in their 10-K financial statements.[5] For each year, we pick the top 50 importers.[6] These firms are matched to their daily stock prices taken from the Center for Research in Security Prices (CRSP). The stock price index is then built by weighting each firm's stock price by its import intensity.[7] Finally, we build the ratio of importers to non-importers, with the latter referring to companies that had never imported while they were part of the sample.

3.3 Macroeconomic data

The third data type used pertains to macroeconomic variables. The dependent variables we are particularly interested in include industrial production, the consumer price index, the producer price index, consumption,

[4]While manufacturing firms bear the brunt of tariffs on goods, service sector companies are also influenced by fluctuating input costs, non-tariff trade barriers, and potential reputation damage during trade conflicts.

[5]A 10-K financial statement is a detailed financial report that public companies have to submit to the US Securities and Exchange Commission (SEC).

[6]Given that 2015 is the last year in the Hoberg-Moon dataset, we assume that the import intensities for 2016-2019 are equal to the average of the last two years in the sample.

[7]We checked that our results are robust to using simple averages and weighing stock prices by firms' market capitalization.

consumer and commercial loans as proxies for investment, imports, and exports. Furthermore, the effect of trade policy on labor market variables such as the unemployment rate and the hiring rate is analyzed. To further refine the analysis, industrial production and consumption by sector are used. The exchange rate (broad dollar index), a measure of uncertainty (VIX), the S&P 500, commodity prices, and the federal funds rate are included as controls since they may be correlated with both the dependent variables and the shock measure described in section 4.2 and capture the state of the business cycle. Most of these variables are obtained from the FRED, the Bureau of Labor Statistics (BLS) and the US Census Bureau. Whenever appropriate, the data is deflated by the CPI and expressed in log per capita terms. More detail on the sources and variable transformations can be found in appendix A.

4 Empirical approach

This section discusses our estimation approach and highlights the benefits of combining trade policy statements with stock market data. The latter help to reveal each statement's surprise element, assess whether announcements are perceived as trade liberalizing or protectionist, and quantify the magnitude of trade policy shocks. However, relying solely on stock market movements carries the risk of misidentifying shocks caused by factors such as exchange rate fluctuations or business cycle fluctuations. To ensure that trade policy shocks are exogenous, it is necessary to combine stock prices with a narrative approach.

4.1 Assessing the usefulness of stock market data

In the following analysis, we illustrate that stock returns can help to classify statements into protectionist and liberalizing and may capture anticipation effects.

To assess how accurately stock returns can indicate the direction of trade

policy changes, we estimate the following simple linear regression by OLS:

$$\sum_{x=t}^{t+1} ret_x^{Ratio} = \alpha + \beta_1 TP_t^{\oplus} + \beta_2 TP_t^{\ominus} + \psi z_t + \epsilon_t, \tag{1}$$

where the left side denotes the cumulative change in the ratio of exporters' and non-exporters' stock indices over two days – the day of the statement release (t) and the day after ($t+1$). More specifically, the regressand is calculated as:

$$\sum_{x=t}^{t+1} ret_x^{Ratio} = \sum_{x=t}^{t+1} \frac{\frac{P_x^{exporter}}{P_x^{non-exp.}} - \frac{P_{x-1}^{exporter}}{P_{x-1}^{non-exp.}}}{\frac{P_{x-1}^{exporter}}{P_{x-1}^{non-exp.}}}, \tag{2}$$

where $P_x^{exporter}$ and $P_x^{non-exp.}$ are the stock indices of exporting and non-exporting (domestically oriented) firms, respectively.[8] This variable is regressed on two trade policy dummies, $TP_t^{\oplus}$ and $TP_t^{\ominus}$, which equal 1 on days with major liberalizing or protectionist statements, respectively, and 0 if no statement was issued or if it could not be classified. We include a vector of controls denoted by z_t. In particular, the S&P 500 index is added as a regressor to purge the results of pure market movements, dummies for other macroeconomic news, namely monetary policy decisions by the Fed, as well as the publication of CPI, PPI or labor market statistics by the BLS.[9] Furthermore, we control for the state of the business cycle by including the spread between 10-Year and 3-Month Treasury bills. In addition, we include the oil price, the effective federal funds rate, and the broad US dollar index since movements in these variables may affect stock prices and policymakers' tendency to enact trade policy changes.[10] Finally, we also incorporate weekday

[8]To verify robustness, the time window over which returns are cumulated is extended to three days, i.e. [t, t+1, t+2], and shortened to include just the day of the event. Since we only know the day but not the exact time at which trade policy statements were issued, using higher frequency stock market data would not have improved the accuracy of our results. We also verify that cumulative returns do not already decrease (increase) before a protectionist (liberalizing) statement is issued to exclude the possibility of capturing pre-existing trends.

[9]This data was downloaded from: fraser.stlouisfed.org and Haver Analytics.

[10]Changes in these control variables may also affect the stock price of trade-exposed and

fixed effects. Standard errors are calculated based on Newey and West (1987) to correct for heteroscedasticity and serial correlation.[11]

Results are presented in table 1. As the first column shows, stock returns for "treated" firms behave as expected, i.e. liberalizing trade policy statements benefit exporters relatively more than non-exporters, and vice-versa for protectionist statements.[12] In other words, companies that generate significant revenue abroad exhibit greater sensitivity to trade policy innovations. This is because their projected future sales are more heavily influenced by both tariff and non-tariff barriers. Stock prices of internationally exposed firms can be influenced by trade partners' actions, as well as US statements, reflecting potential foreign retaliation and the fact that exporting firms also tend to be importers of input factors (Bernard et al. (2009)). However, the magnitude of these responses remains modest following both types of policy changes, as they fall below one standard deviation when compared to the daily fluctuations observed throughout our sample period. Thus, there are potentially more important factors than trade policy that influence the profits of exporters and domestically oriented firms, and that momentous reforms are necessary to generate large movements in returns (see section 4.2).

non-exposed firms differently, and hence alter their ratio.

[11]Serial correlation arises because the dependent variables are cumulated over two days and therefore correlate with their own leads and lags.

[12]Regressing the cumulative change in the ratio on leads and lags of the trade policy dummies, we verified that market movements do not already occur before statements are issued.

Table 1: The stock market effect of liberalizing and protectionist official trade policy statements

	(1) $\Delta \frac{P_{\text{exporter}}}{P_{\text{exporter}}^{\text{non-}}}$	(2) $\Delta P_{\text{exporter}}$	(3) $\Delta P_{\text{exporter}}^{\text{non-}}$	(4) $\Delta \frac{P_{\text{importer}}}{P_{\text{importer}}^{\text{non-}}}$
$TP_t^{\ominus}$ (Protectionist statement)	-0.342***	-0.181**	0.144*	-0.0978
	(-3.47)	(-2.60)	(2.38)	(-0.73)
$TP_t^{\oplus}$ (Liberalizing statement)	0.445***	0.305***	-0.128*	0.422*
	(4.44)	(3.46)	(-2.45)	(2.39)
Constant	0.554	0.794*	0.299	1.798*
	(1.22)	(2.06)	(0.91)	(2.45)
Observations	3219	3219	3222	3075
Controls	Yes	Yes	Yes	Yes
Weekday FE	Yes	Yes	Yes	Yes

t statistics in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Notes: Trade policy dummies, $TP_t^{\oplus}$ and $TP_t^{\ominus}$, equal 1 on days with major liberalizing or protectionist statements, respectively, and 0 if no statement was issued or if it could not be classified. Dependent variables are cumulative for t_0 and t_1: (1) change in the ratio of the stock price indices of exporting and non-exporting firms, (2) excess return on the stock price index of exporters, (3) excess return on the stock price index of non-exporters, (4) cumulative change in the ratio of the stock price indices of importing and non-importing firms. Controls include the cumulative return on the S&P 500, the oil price, the federal funds rate, the broad USD index (exchange rate), the spread between 10-Year and 3-months Treasury Bills, dummies for other macroeconomic news (FOMC meetings, BLS announcements of inflation and employment statistics). Standard errors are calculated based on Newey-West.

To pinpoint whether the changes in the stock price ratio are driven by the numerator or the denominator, we calculate the excess return on exporters' and importers' baskets over the return on the S&P 500 index based on a standard market model. This ensures that general market movements cause none of the return variation. Columns (2) and (3) show that excess returns on the two stock baskets are pushed in opposite directions. Thus, in the case of liberalizations, exporters benefit from easier access to foreign markets and potentially cheaper foreign inputs.[13] In contrast, non-exporting firms seem to be adversely affected by increased competition from abroad, resulting from lower trade barriers.

A similar conclusion can be drawn when using the cumulative change in the stock price ratio of importing and non-importing firms (table 1, column (4)). The former benefit relatively more from lower trade barriers than the latter. However, entering the two types of stock indices as separate regressands yields no significant results, and the coefficients are therefore not displayed. In summary, stock returns differentiated by firms' trade exposure, especially export activity, accurately reflect the direction of trade policy changes according to our subjective classification. To summarize, the differentiation of stock returns based on firms' exposure, particularly when comparing exporters and non-exporters, accurately reflects the direction of trade policy changes on average based on our ex-ante subjective classification.

Next, we show that stock returns reflect certain anticipatory effects. For that purpose, we distinguish between trade policy announcements and implementations. We treat positive and negative shocks symmetrically by combining them into a single variable with the appropriate signs. Hence, the results should be understood as the outcome of a shock that promotes trade liberalization. According to Table 2, all dependent variables exhibit a significant response to announcements, but the same cannot be said for implementations. Only the stock price ratio of exporters to non-exporters (column (1)) responds significantly, primarily driven by a decline in the

[13] As mentioned earlier, exporting firms are more likely to import than non-exporters (see also Bernard et al. (2009)).

latter (column (3)). Neither the stock price of exporters nor the ratio of importers to non-importers responds significantly to implementations. Therefore, there is evidence suggesting that, in some instances, investors may anticipate implementations, whereas announcements contain a stronger element of surprise.[14] This intuitive result aligns with expectations and makes stock prices an ideal tool for identifying unanticipated trade policy shocks.

Table 2: The stock market effect of trade policy announcements and implementations

	(1) $\Delta \frac{P_{\text{exporter}}}{P_{\text{non-exporter}}}$	(2) $\Delta P_{\text{exporter}}$	(3) $\Delta P_{\text{non-exporter}}$	(4) $\Delta \frac{P_{\text{importer}}}{P_{\text{non-importer}}}$
$TP_t^{Implementation}$	0.342**	0.150	-0.172**	0.149
	(2.93)	(1.65)	(-2.90)	(0.71)
$TP_t^{Announcement}$	0.411***	0.277***	-0.122*	0.289*
	(4.85)	(4.18)	(-2.46)	(2.33)
Constant	0.532	0.768*	0.296	1.721*
	(1.18)	(2.01)	(0.91)	(2.36)
Observations	3219	3219	3222	3075
Controls	Yes	Yes	Yes	Yes
Weekday FE	Yes	Yes	Yes	Yes

t statistics in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Notes: See table 1. Independent variables: Trade policy dummies indicating whether a trade policy statement was a preliminary announcement or implementation.

In summary, stock price movements, categorized by firms' trade exposure, serve as a reliable indicator to determine the direction of policy changes. On average, they accurately reflect whether a trade policy change is liberalizing or protectionist and provide a valuable signal for unanticipated policy shifts. Furthermore, stock prices can serve to quantify the magnitude of policy shocks, which will be further explored in the next section.

[14] As appendix C shows, many trade policy changes have been announced several times before they were implemented and hence investors may have already incorporated these into their decisions.

4.2 Identifying trade policy shocks

We identify trade policy shocks between January 2007 and December 2019 based on official statements and stock price data for exporters and non-exporters. We adopt an ex-ante agnostic approach to whether a trade-related statement is protectionist or liberalizing because the objective categorization is difficult in some cases, as detailed in appendix E. Moreover, as shown in section 4.1, stock prices provide us with a reliable means of determining the direction of the policy change.

A *protectionist (liberalizing)* shock is identified for a given day, whenever the following conditions are satisfied:

(a) a trade policy statement was issued, and

(b) both the cumulative change in the stock price ratio of exporting and non-exporting firms (see equation (2)) **and** the cumulative returns on the exporters' stock basket[15] are *negative (positive)*.

To avoid misclassification, both conditions in (b) are necessary. Neglecting the former could lead to misidentifying a trade policy shock when it is actually caused by an unrelated event affecting the stock market as a whole. Neglecting the latter could lead to misclassifying a statement as protectionist, ignoring the possibility that the stock price index of non-exporting firms outperforms that of exporters and causes the ratio to fall. The approach allows for domestically operating firms to respond to a trade policy statement since they may be influenced through upstream suppliers. However, we require internationally operating firms to be relatively more affected.[16] The reason for cumulating

[15] I.e.

$$\sum_{t=0}^{1} ret_t^{exporter} = \sum_{t=0}^{1} \frac{P_t^{exporter} - P_{t-1}^{exporter}}{P_{t-1}^{exporter}}. \tag{3}$$

[16] For example, after a surprise protectionist shock caused by US policymakers, the price ratio is likely to fall if exporting firms expect retaliation, if exporters have a higher tendency to import than non-exporters which is well-established or if domestically oriented firms are competing with foreign producers such that they benefit from market protection. From appendix D it becomes clear that almost half of the example companies in the domestic stock basket provide services which do not rely on foreign inputs making these firms not only less exposed to US trade policy

returns over a two-day window [0,1], i.e. the day of an announcement and the subsequent day, is to account for lags in investors' decision making.[17] The size of trade policy shocks is captured by equation (2), i.e. the shock series takes the value of the cumulative change in the two baskets' ratio. This ratio better reflects the impact of trade policy compared with the cumulative returns on the exporters' basket, which may follow general market movements caused by news unrelated to trade, as mentioned above. On days without trade policy-relevant news, the shock series equals 0.

Figure 2 shows the resulting shock series at the daily frequency and highlights the largest protectionist and liberalizing shocks in the sample.[18] Three observations confirm the plausibility of our shock series: First, trade policy shocks became larger, more frequent, and more protectionist after President Trump took office. Second, 75% of the daily shocks have the expected sign based on our ex-ante subjective classification of statements. Third, the shocks seem to accurately reflect momentous trade policy changes, i.e. those that are particularly surprising, involve a large share of traded goods or substantial tariff changes.

through their buyers but also suppliers.

[17] If a trade policy statement is issued during the weekend or a public holiday, we consider the nearest day on which stock markets re-open, as the day of the announcement.

[18] Figure 8 plots the distribution of daily shock sizes and compares them to the average cumulative change in the stock price ratio of exporters to non-exporters for the whole sample period.

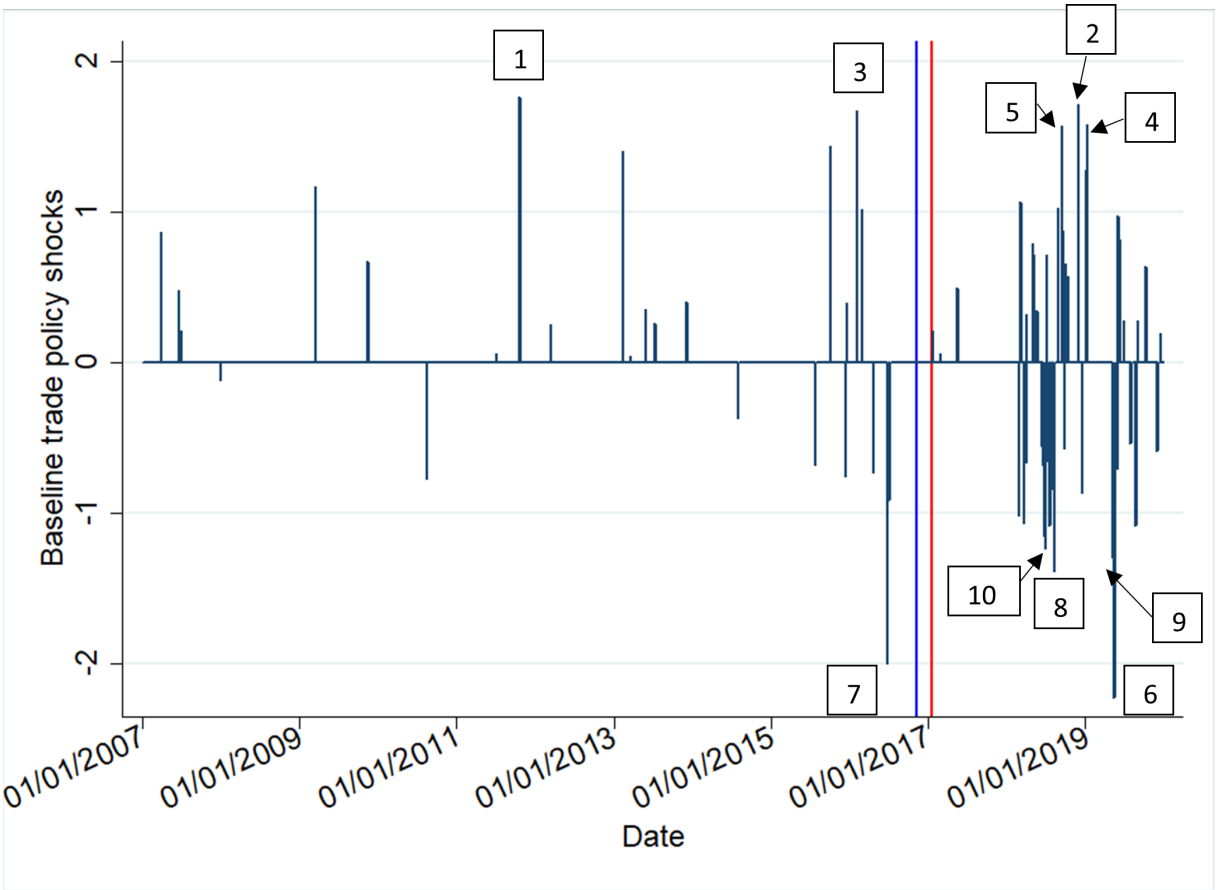


Figure 2: **Daily** baseline trade policy shocks. The vertical lines represent the day on which the 2016 election results were announced (blue) and President Trump took office (red).

The largest **liberalizing** shocks (2007-2019):
1- Mexico lifts tariffs on dozens of US imports. (21/10/2011)
2- US-Mexico-Canada FTA signed; Trump announces to maintain tariffs at 10% on $200 bn worth of Chinese products, without increasing them to 25%. (30/11/2018 & 01/12/2018)
3- Trans-Pacific Partnership agreement signed (03/02/2016)
4- Talks between the US and China to de-escalate tariff war. (09/01/2019)
5- Trump signs law reducing or eliminating import tariffs on over 1,660 items, including half made in China. (13/09/2018)

The largest **protectionist** shocks (2007-2019):
6- The Trump administration claims certain cars and car parts threaten US national security; will urge trade partners to limit auto exports. (17/05/2019)
7- UK voted to leave the EU (with implications for future UK-US tariff rates). (23/06/2016)
8- Trump announces raising steel tariff on Turkey from 25% to 50%. (10/08/2018)
9- Trump plans to raise 10% section 301 tariffs on $200 billion of Chinese imports to 25% and threatens to impose tariffs on all Chinese imports. (05/05/2019)
10- Canada imposes tariffs on US products totaling $12.8 bn, half of these affect steel and aluminum (25% tariff rate). (01/07/2018)

The "most liberalizing" day occurred in October 2011 on which Mexico announced to suspend all its retaliatory tariffs it had imposed in response to the US blocking Mexican trucks from entering the country for several years. This event resulted in a 1.77% cumulative increase in the stock price ratio which represents 2.4 standard deviations. The second most beneficial day for US exporters marked the signing of the revised NAFTA (now: US-Mexico-Canada Trade Agreement) in 2018. Furthermore, negotiations of the Trans-Pacific Partnership (TPP) Agreement (from which President Trump later withdrew) is among the most liberalizing events. This seems reasonable considering that TPP would have been the largest new trade agreement of the last decade (member countries account for 40% of global GDP), which was estimated to increase US incomes by 0.5% of GDP and US exports by 9.1% (Peterson Institute, 2016). The remaining large positive shocks relate to a de-escalation of the tariff war between the US and China between 2018 and 2019. Since China, Mexico, and Canada are among the largest trade partners of the US and combined account for almost half of US imports and exports, the results above are in line with prior expectations.

The "most protectionist" day occurred in May 2019, when Trump announced that imports of automobiles and parts from the EU, Japan, and others pose a threat to national security and would potentially be restricted. The UK's vote to leave the EU, implying higher future barriers to trade with the US, resulted in the second largest protectionist shock. The fact that both decisions caught the public by surprise explains at least parts of the large stock price response.[19] The remaining key protectionist events refer to tariff threats by the Trump administration towards Turkey and China, as well as Canada's implementation of retaliatory tariffs on US steel and aluminium exports. Overall, the identified shocks largely align with events that would be considered crucial based on common sense. Hence, augmenting a narrative identification with stock market data allows us to gauge the size of trade shocks.

[19] After all, the UK only accounts for approx. 3% or US trade.

This approach is particularly valuable for policy changes that encompass both tariff and non-tariff barriers, with the latter being challenging to quantify.[20]

Since we are interested in the macroeconomic impact of trade policy shocks, we aggregate the daily shocks into a monthly shock series.[21] The latter is depicted in figure 7 and will be utilized throughout the remainder of the paper. Between January 2007 and December 2019, we identify 29 trade liberalizing and 17 protectionist shocks at the monthly frequency.[22]

In addition to our baseline shocks, we build a series distinguishing between statements released by the US administration and its trade partners, and we differentiate between announcements and implementations. The insights obtained from such a differentiated analysis are valuable because they gauge the role of uncertainty and policy makers' credibility as well as the true cost or benefit of US trade actions which may depend on trade partners' responses.

4.3 Validating the exogeneity of trade policy shocks

In the following, we provide evidence that the identified trade policy shocks are exogenous and that augmenting stock market data with a narrative approach is crucial for exogeneity.

For our results to be valid, trade policy decisions must be unrelated to business cycle conditions. In the US, at least within the time period under consideration, the key driver of trade policy seems to be the president's political views rather than the economic cycle. This is evident in the Obama administration, which encompassed both the aftermath of the 2007-2008 crisis and subsequent expansion, yet predominantly proposed trade liberalizing measures (see figure 7). In contrast, the Trump administration, which began

[20] Examples of non-tariff barriers include import bans, restrictive licenses and lengthy customs procedures.

[21] In some months more than one statement has been made. In section 6.1 we verify the robustness of our results to different ways of aggregating shocks across the month.

[22] As shown in figure 9, the magnitude of more than 80% of the shocks falls between -2 and +2. Stated differently, the cumulative change in the ratio of exporting to non-exporting firms' stock index around trade policy events tends to be between -2% and 2% within a month.

during an expansion, predominantly advocated protectionist measures. This challenges the conventional belief that protectionism is counter-cyclical (see, for example, Bohara and Kaempfer (2016)). Rose (2013) further underpins our observation by showing that trade policy has been acyclical since World War II. Despite this evidence, we still control for the state of the business cycle within our estimation in order to ensure that the effect we are capturing is indeed exogenous.

Moreover, we provide additional formal evidence that our shocks are not contaminated by: (a) other macroeconomic shocks, (b) the current and past economic state, (c) expectations about future economic conditions, and (d) uncertainty. Following Caldara et al. (2020), we first look at the correlation between our identified trade policy shocks and conventional macroeconomic shocks and then test for Granger causality. Potentially confounding shocks include those related to technology, monetary policy, oil prices, and terms of trade. In line with Caldara et al. (2020), we extract technology shocks by estimating an AR(1) model of the log-difference in total factor productivity (TFP) adjusted for utilization (Fernald (2014)) and store the residuals. Terms of trade shocks are constructed in a similar way using the ratio of export and import prices. Moreover, oil price shocks are taken from Hamilton (2003). Since conventional time series of monetary policy shocks (e.g. Romer and Romer (2004)) are unavailable for our sample period, we revert to estimating a Taylor rule for the pre-sample period and calculate predicted interest rates. Deviations of the realized federal funds rate from predicted values represent monetary policy surprises and serve as shocks. To verify robustness, we also calculate predicted interest rates using equal weights for the output and inflation gaps as originally suggested by Taylor (1993). More details on how the Taylor rule is estimated and the data used can be found in appendix F.1. As shown in table 6, our baseline trade policy shock is not Granger caused by any of the macroeconomic shocks considered, and none of the correlations is significant at the 5% level.

Furthermore, our shock is contemporaneously uncorrelated and exogenous to past economic conditions as measured by the unemployment rate, growth in industrial production, and four different indices measuring the state of the business cycle. These indicators include the recession probability from Chauvet and Piger (2020), the Coincident Economic Activity Index, the Purchasing Manager's Index (PMI), and the Chicago Fed National Activity Index.[23]

In addition, forward-looking variables such as measures of consumer and business confidence, and the real oil price do not predict our shock series.[24] Hence, policymakers do not seem to implement protectionist trade policy changes in anticipation of a recession. Only the S&P 500 return Granger causes our shock series. This is unsurprising given that we use the cumulative change in the 50 most and least export-dependent companies in the S&P 500 basket. Exporting firms seem to co-move more strongly with the overall equity market than domestically focused firms. To account for this, we control for the S&P 500 in our estimations, and we also build an alternative shock series that calculates the excess return on the exporters' basket over the S&P 500.[25]

Finally, macroeconomic and financial uncertainty, as well as economic policy uncertainty (EPU), do not Granger cause our trade policy shocks. The F-test for uncertainty caused by trade policy (EPU Trade) is also insignificant at the 5% level. However, vice versa the opposite holds: our trade policy shock has substantial predictive power for EPU Trade. This index, described in Baker et al. (2016), relies on counting the number of US newspaper articles that mention economic policy uncertainty and trade policy matters. Since the identified trade policy shock is based on official policy statements, which should precede the newspaper coverage, this result is unsurprising and confirms that our shock is unanticipated. The correlation coefficient (-0.2837) for the two series has the expected sign, implying that protectionist trade policies create

[23] Details on these indices can be found in appendix A.

[24] Real oil prices are used in addition to oil shocks since only the former are available at the same frequency as our original trade policy shocks (i.e. monthly).

[25] This alternative shock series is not Granger caused by the S&P 500.

uncertainty while liberalization policies reduce it. However, the correlation coefficient indicates that our shock is an imperfect measure of trade policy uncertainty. Instead, it captures information beyond second-moment effects and allows for the possibility that macroeconomic effects of trade policy are driven by (expected) changes in the first moments.

Table 7 displays the results from using the stock price ratio of exporters to non-exporters alone, disregarding trade policy statements, instead of the identified trade policy shock. This series is Granger caused by monetary policy shocks, unemployment, business confidence, and financial uncertainty, and it also correlates with terms of trade shocks. Furthermore, the stock market ratio no longer causes trade policy-induced uncertainty, reflecting that its movements may be driven by other events that are unrelated to trade.

Overall, there is strong evidence that the identified trade policy shocks are exogenous to other sources of macroeconomic fluctuations. This is not true when using stock market data alone, which underlines the merit of combining it with a narrative approach.

4.4 Estimating impulse responses by local projections

We use the local projections method (LPs) developed by Jordà (2005) to quantify the impact of trade policy shocks. Unlike the standard VAR approach, the impulse response functions (IRFs) from local projections are estimated in a series of regressions for each prediction horizon h and for each dependent variable of interest (Jordà (2005)). Among the advantages of this method is that LPs allow us to distinguish between the impact of protectionist and trade liberalizing measures. Second, they help us to detect non-linear effects depending on the size of the tariff change. These advantages, however, come at the cost of often less precise and more erratic impulse response functions and serial correlation in the error terms. The latter issue is addressed using Newey-West standard errors, which also correct for heteroscedasticity (Newey and West (1987)).

Following the notation of Ramey and Zubairy (2018), for each dependent variable x and horizon h, we estimate the following equation:

$$x_{t+h} = \alpha_h + \beta_h shock_t + \psi_h(L) z_{t-1} + \phi_h \text{trend}_t + \epsilon_{t+h} \quad \text{for} \quad h = 0, 1, 2, ...H \quad (4)$$

where x is one of the dependent variables of interest. These include industrial production, manufacturing sales, aggregate price indices (PPI and CPI), exports, and imports. Since we are also interested in the effect of trade policies on households and the labor market, we consider consumption, the unemployment rate, and hours worked. Furthermore, loans to consumers and businesses are proxies for investment. Where appropriate, the dependent variables are in logs and in per capita terms. The variable *shock* refers to our identified exogenous trade policy shock, described in the previous section. We include a vector of lagged control variables z, aiming to capture the state of the business cycle and other potentially confounding influences. These include the unemployment rate, the federal funds rate (FFR), the global commodity price index, the VIX as a proxy for uncertainty, S&P 500 returns, and the broad trade-weighted US Dollar Index. The latter two are important to purge our shock measure of general stock market movements and the influence of exchange rate fluctuations which may affect trade-exposed firms disproportionately. We also control for lags of both the dependent variable and the shock variable in order to capture any possible serial correlation in the trade policy variable. $\psi_h(L)$ is a polynomial of order one in the lag operator, determined using the usual optimal lag criteria. We determine the optimal lag-length in the 1-period ahead estimation ($h = 1$) and use this for the estimation of the rest of the horizons. This method, according to Brugnolini (2018), is superior to selecting a different lag-length for each horizon. A linear time trend is included where appropriate to account for the fact that the majority of the dependent variables grow at a constant rate.[26] The coefficient of interest is β_h which gives

[26] A time trend is included for all dependent variables except for the unemployment rate, hiring rate, hours worked, business and consumer confidence. Most results are robust to the inclusion

the response of x at time $t+h$ to the shock at time t. The impulse response functions are then constructed as a sequence of the β_h's estimated in a series of single regressions for each of the 20 horizons plotted.

In order to investigate whether protectionist or liberalizing shocks have asymmetric effects, we can allow the coefficient of interest to vary depending on the sign of the shock. In particular, we estimate the following equation for each dependent variable x and horizon h:

$$x_{t+h} = I_t(\alpha_h^P + \beta_h^P shock_t + \psi_h^P(L)z_{t-1}) + (1-I_t)(\alpha_h^L + \beta_h^L shock_t + \psi_h^L(L)z_{t-1}) \\ +\phi_h \text{trend}_t + \epsilon_{t+h} \quad \text{for} \quad h = 0, 1, 2, ...H \tag{5}$$

where I_t is a dummy variable that equals 1 or 0 whenever the shock at time t is protectionist or liberalizing, respectively. Therefore β_h^P captures the impact of a protectionist trade policy shock, whilst β_h^L captures the effect of a liberalizing measure. If the difference between β_h^P and β_h^L is statistically different from zero, then the effects between a trade liberalizing and a protectionist shock are asymmetric. An analogous equation is estimated to contrast the effects of trade policy announcements and implementations and to distinguish between shocks initiated by the US and its trade partners.

Finally, in order to study non-linear effects depending on the size of the shock, we augment equation (5) to include a quadratic term of the trade policy shock, i.e.

$$x_{t+h} = \alpha_h + \beta_h shock_t + \beta_s (shock_t)^2 + \psi_h(L)z_{t-1} \\ +\phi_h \text{trend}_t + \epsilon_{t+h} \quad \text{for} \quad h = 0, 1, 2, ...H \tag{6}$$

The effects of a trade policy shock are size-dependent if β_s is significant and if a likelihood-ratio test indicates a better fit for the augmented model than the linear-only nested model.

of a quadratic trend.

5 Results

In this section, we first describe the results from the baseline shock, which assumes that no asymmetries exist in the effects of protectionist and liberalizing shocks. We then relax and test this assumption in section 5.2, demonstrating that non-linearities do not arise in the sign of the shock. We also find that the cause of the shock seems does not matter since we find no statistically significantly different effects following trade policy implementations compared to initial announcements in Section 5.3. However, section 5.4 documents more significant responses to shocks caused by trade partners rather than by the US. Finally, section 5.5 points to non-linearities in the responses of investment and trade, implying that large trade policy shocks have disproportionate effects on these variables.

5.1 Baseline shock

In equation (4), we do not distinguish between positive and negative shocks but implicitly assume that their effects are symmetric. Hence, the following results should be interpreted as being driven by a trade liberalizing shock. Figure 3 shows the plots of the IRFs of the main variables of interest along with the 68% and 90% confidence intervals.

The baseline liberalizing shock leads to an increase in industrial production after seven months, and hence, the opposite should hold for a protectionist shock (figure 3a). To provide an interpretation of the magnitude of the response: a liberalizing trade policy statement that triggers a cumulative change (for t_0 and t_1) in the ratio of exporters to non-exporters of 1%, increases industrial production by 0.75% at its peak, 16 months after the shock. Signing the Trans-Pacific Partnership (TPP) agreement, for example, led to an increase of 1.67% in the cumulative return on the stock price ratio. This in turn resulted in a 0.76% increase in industrial production at its peak in month 16.

The response of industrial production is predominantly driven by increased

production of manufacturing goods (figure 3g) rather than by other sectors such as materials or consumer durables production.[27] This result is confirmed by an increase in manufacturing sales (figure 3h). Considering that machinery, motor vehicles and parts, as well as chemical products, account for half of US exports (UN Comtrade (2017)) and are all part of the manufacturing sector, this result seems to point to higher foreign demand. Indeed, figure 3c shows a spike in exports ten months after the shock that remains positive before dying out 16 months after the shock. Imports display similar dynamics, confirming that lower trade barriers indeed increase trade flows (figure 3d).[28] Net exports increase during the first five months after the shock before showing erratic behavior (figure 3i). Hence, at least partial evidence exists against President Trump's claim that tariffs will improve the US trade balance.

Firms seem to boost their investment, proxied by commercial loans (figure 3b), already before industrial production and manufacturing sales increase. Hence, they seem to anticipate future opportunities for exporting.[29]

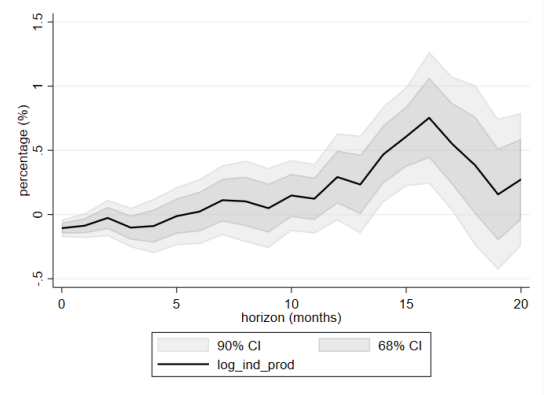
Furthermore, introducing trade liberalizing policies reduces unemployment (figure 3e) and slightly increases the hire rate (figure 3j). These contribute to the increase in the consumption of goods, already 4 months after the liberalizing trade policy shock, mainly driven by non-durables (figure 3f). Furthermore, there is also an increase in the consumption of services. However, the response is much more muted since the majority is non-tradable.

We find no statistically significant effect of trade policy shocks on consumer and producer price levels (figures 3k to 3l).

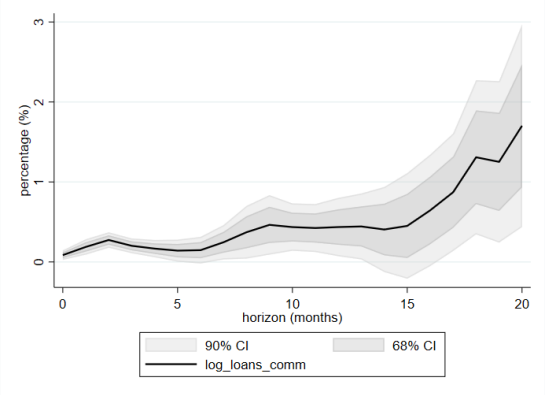
[27] Plots for non-responsive sectors are not displayed but are available upon request.

[28] The same holds when expressing imports and exports as a share of GDP as well as for trade openness (defined as the sum of exports and imports, as a percentage of GDP).

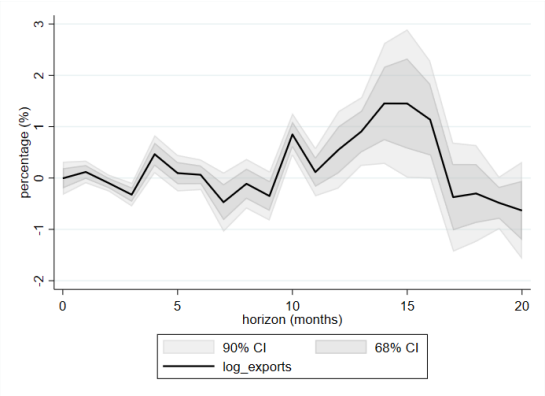
[29] The response is shown up to 20 months after the shock, which corresponds to the peak response of commercial loans to the baseline shock. The response declines afterwards.



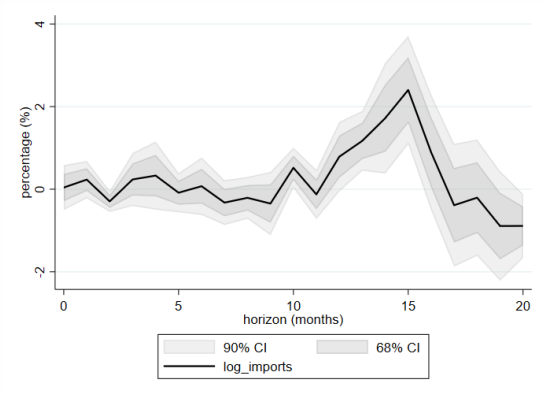
(a) Industrial production (in logs)



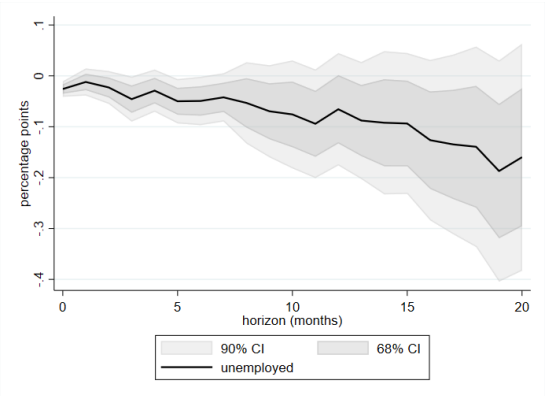
(b) Commercial loans (in logs)



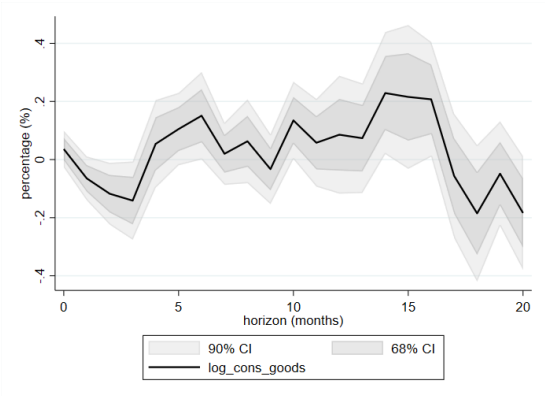
(c) Exports (in logs)



(d) Imports (in logs)

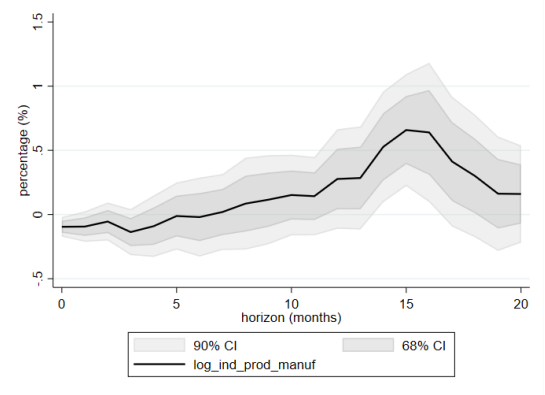


(e) Unemployment rate

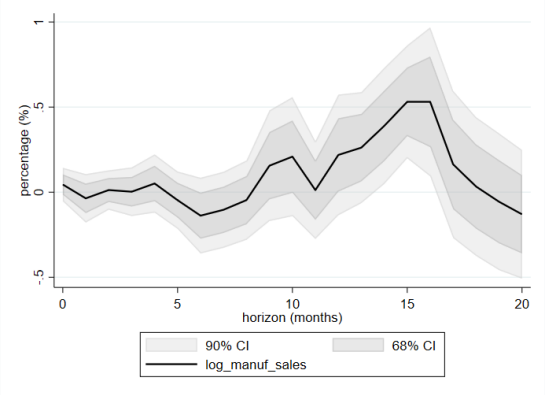


(f) Consumption of goods (in logs)

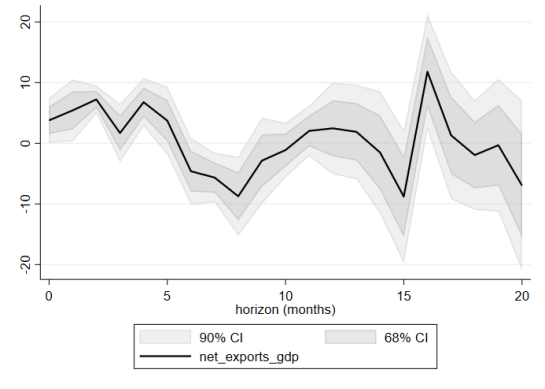
Figure 3: IRFs for a baseline trade policy shock



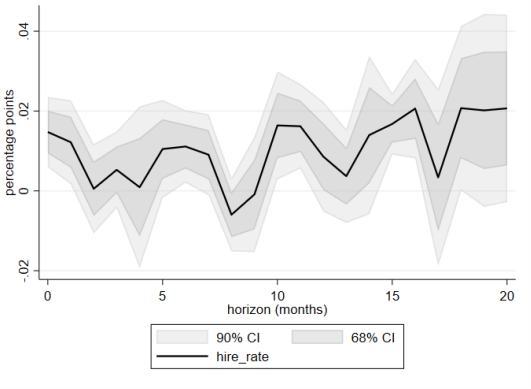
(g) Ind. prod.: Manufacturing (in logs)



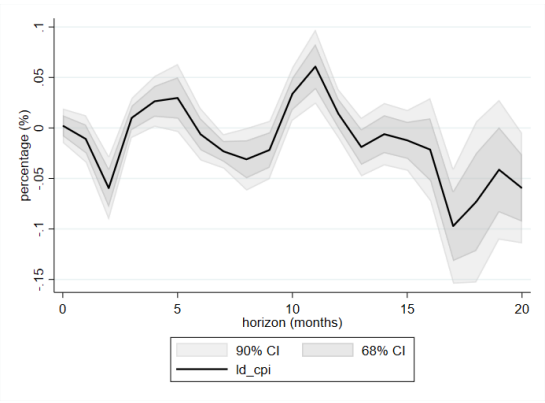
(h) Manufacturing sales (in logs)



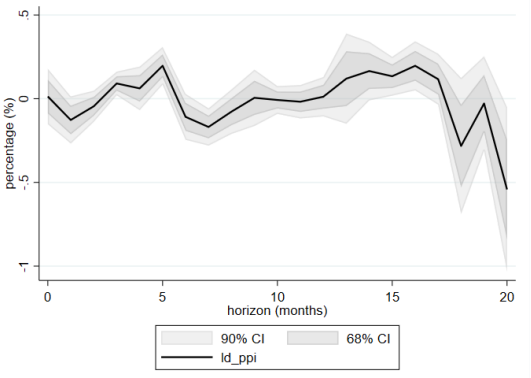
(i) Net exports (% of GDP)



(j) Hire rate



(k) Inflation rate (Consumer price index)



(l) Inflation rate (Producer price index)

Figure 3: IRFs for a baseline trade policy shock

5.2 Protectionist versus liberalizing shocks

Our identification strategy allows us to examine the presence of asymmetries in the effects of trade policy shocks with different signs by estimating equation (5). The plots in appendix G.1 compare the results for a liberalizing shock (first column) and a protectionist trade policy shock (middle column).[30] The right column visualizes the t-statistic from testing the null hypothesis that their response is equal.[31]

As expected, industrial production, exports, and imports increase after a liberalizing shock and decline after a protectionist shock. However, we find no statistically significant differences in the response of macroeconomic variables to liberalizing and protectionist shocks. This implies that the gains from trade liberalizations and the damage from protectionism are of equal magnitude in absolute terms, with no non-linearities observed along this dimension.

5.3 Announcements versus implementations

Our approach to constructing trade policy shocks also allows us to compare the effect of announcements of future policy changes and their implementations.[32] Such insights help to gauge the role of uncertainty at different stages of the policy-making process and may be useful for political leaders aiming to optimize their communication strategy.

The IRFs in appendix G.2 contrast both types of shocks, and we again display the results from testing for statistically different coefficients. As for

[30] Note that in this and the following sections, we no longer display the full set of IRFs as in the baseline. However, all plots are available upon request.

[31] Here we are interested in comparing absolute magnitudes to answer the question of whether protectionist shocks are more harmful than liberalizations are beneficial which does not seem to be the case.

[32] It is useful to keep in mind that by definition, the identified shocks associated with implementations are unanticipated, otherwise they would have been incorporated in market expectations and would not have resulted in stock price movements. Indeed, some implementations are not identified as shocks because they were anticipated. Hence, the difference between the results obtained from announcements and implementations should not be due to anticipation effects.

the baseline, we assume that shocks of different signs have symmetric effects, therefore the IRFs should be interpreted as responses to a liberalizing shock. This is a plausible assumption given the findings of the previous section 5.2, where we find that there are no non-linearities in the sign of the shock.

We find that for the majority of variables, the responses to implementations and announcements are not statistically different (figures 17 to 20). However, industrial production appears to move in opposite directions following the two shocks - it increases after a liberalizing implementation but falls after a pure announcement leading us to reject the null hypothesis of equal coefficients (figure 4).

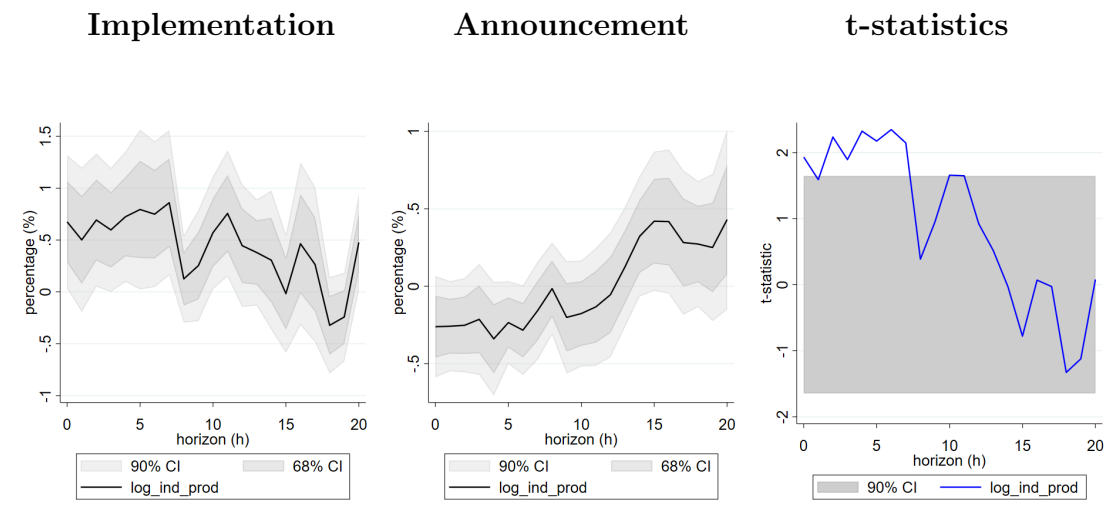


Figure 4: Industrial production (in logs)

The difference in responses is statistically significant for the first 6 months after the shock, which suggests that after that the response to announcements captures the effect of a potential implementation.[33]

[33]To exclude this possibility, we compare the effects of implementations and announcements that were never implemented. We find that agents are not able to distinguish ex-ante between announcements that would later be implemented and those that would not.

5.4 Trade policy shocks initiated by the US versus its trade partners

Comparing the effects of a trade shock initiated by the US to one caused by trade partners, it appears that the latter has more significant effects on the US economy.[34] This is most evident for commercial loans, which show a stronger positive response for twelve months after another country lowers trade barriers towards the US (figure 24). This seems plausible since firms may need to borrow to enter the foreign market or expand existing export capacities. Expanding import activities because of lower US trade barriers may not require the same amount of external funding for firms. To provide a rough estimate of the quantitative importance of this result, let us consider a major unilateral trade liberalization in our sample. Mexico's decision to cut tariffs by half on a wide range of US products in July 2011, resulted in a cumulative return on the ratio of exporters to non-exporters of 1.15%. Consequently, commercial borrowing may have increased by approximately 10.1% at its peak, 15 months after the shock.[35]

Furthermore, unemployment falls significantly only after a positive foreign shock (figure 25). Similarly, the overall consumption of goods increases following a foreign shock, before declining after 15 months (figure 23). In contrast, the response of consumption to a US trade shock is positive on impact but no longer significant at the 90% level after 1 month (figure 22). This seems counter-intuitive as lower US import barriers should lead to cheaper consumer goods. However, the response may be driven by the employment-boosting effect of foreign trade liberalizations which fails to materialize after US liberalizations.

Since, by assumption, protectionist shocks should have the opposite

[34]The estimation of a model including only a linear trend (like in the rest of the paper) resulted in anomalous-shaped IRFs, suggesting that such model is misspecified. We therefore augment the model to include a quadratic trend in addition to a linear one. Note that "US initiated" shocks also include those caused by multilateral agreements since the US is often the leading force behind such negotiations.

[35]This assumes that the effect across foreign-induced positive and negative shocks is the same.

effect, the above observations hint at the detrimental impact of foreign retaliations during the recent tariff war on firm investment, unemployment, and consumption. Unfortunately, when allowing for asymmetries across both initiating party and shock sign (protectionist and liberalizing), none of the responses were significant. This outcome can be attributed to the scarcity of unilateral statements, particularly those pertaining to liberalizing measures, as trade partners often make joint declarations. However, based on the insights from the previous sections, we can provide a rough estimate. For instance, the implementation of retaliatory tariffs such as by the EU on $3.2 billion of US products in June 2018 points to a decrease in US firm investment by -0.9% to -4.6% on impact.[36] It is likely that comparable declines took place following the implementation of the most potent retaliatory measures by Canada and China in 2018/19. However, as the next section shows, these estimates may be further exacerbated due to non-linearities.

5.5 Non-linearity in shock size

The last element of our inquiry into heterogeneous trade policy effects consists of non-linearities depending on the size of the shock. Following the estimation of equation (6), we plot the coefficient for the quadratic term for each horizon (first column) and the associated t-statistics together with the 90% acceptance interval (±1.645) (middle column) in appendix G.4. The third column shows the p-values at each horizon from a likelihood-ratio test of whether the linear-only nested model fares better than the model with the squared shock term.

We find evidence of size dependence on impact for all macroeconomic variables we consider in our analysis. Especially, firm investment (proxied by commercial loans) seems to be boosted disproportionately strongly for large liberalizing shocks and, assuming symmetry, would be harmed more by large

[36]This range is based on a fall of cumulative returns of -1.15% combined with the point estimates for protectionist shocks, implementations and foreign trade policy changes.

protectionist shocks. The effect for most variables, including commercial loans, industrial production, exports, and imports, is long-lived since the squared shock term is significant even after twelve months. The non-linear response observed for commercial loans may be due to the limited resources available to firms, which may only be sufficient to cope with smaller trade liberalization shocks. However, in the face of more significant shocks, binding financial constraints may emerge, necessitating borrowing to expand production and trading capacity. Subsequently, borrowing may allow firms to expand their capacity disproportionately. The existence of fixed costs for engaging in international trade may accentuate the non-linear response to trade policy shocks, creating threshold effects. Future research should investigate the level of the threshold above which trade policy changes become particularly effective.

6 Sensitivity analysis and extensions

The following section examines the robustness of our results to different ways of constructing the trade policy shock series (section 6.1) and a different definition of trade exposure (i.e. import dependency) used in our shock identification (section 6.2). Furthermore, we evaluate whether the effects are different under President Trump compared to previous presidents (section 6.3). Finally, we use tweets as an alternative source of trade news (section 6.4).

6.1 Constructing alternative baseline shock

To verify the robustness of our results, we propose several alternative methods to obtain trade policy shock series. All of these yield very similar IRFs to our baseline. In appendix H.1, we only plot the results for industrial production, commercial loans, consumption of goods, and unemployment since these were most significant in section 5.1.

First, we generate monthly shocks from the original daily series in two alternative ways. Instead of adding up the cumulative change in the stock

price ratio of exporters to non-exporters caused by statements, we take the average over the month. Figure 30 shows that after a trade liberalizing shock, industrial production still increases with a small lag. Demand for commercial loans rises shortly after impact and stays elevated. After an initial decline, the consumption of goods picks up, and unemployment follows a persistent downward trajectory. Next, if there are several shocks within a month, we only use the larger one in absolute terms. Again, the results are robust (figure 31).

Furthermore, we build a shock series for which we are no longer ex-ante agnostic about the sign of the shock but only select those that are correctly identified based on a subjective classification of statements.[37] Figure 32 confirms that the macroeconomic impact is the same as for the agnostic approach.

Moreover, instead of using the ratio of the international and domestic sales baskets, we calculate the excess return of the exporters' basket over the S&P 500 index based on a standard market model.[38] This approach ensures that none of the variation in the exporters' stock price index is caused by general market movements. Figure 33 shows almost no deviations from the baseline.

To avoid capturing the effect of other macroeconomic news, which may lead to fluctuations in the two stock baskets, we discard announcements that coincided with monetary policy decisions by the FOMC or the publication of CPI, PPI, or labor market statistics by the BLS.[39] Our conclusions remain the same (figure 34).

[37] Examples of protectionist, liberalizing and unclassified statements can be found in appendix F. Although trade policy statements were classified into protectionist and liberalizing only if such classification could be made without doubt, a sentiment analysis based on machine-learning should be performed in the future to eliminate subjectivity.

[38] We estimate

$$ret_t^{EX} = \alpha + \beta ret_t^{S\&P500} + e_t \quad \text{for 2006}$$

and then obtain excess returns from

$$\widehat{excess}_t = ret_t^{EX} - \hat{\alpha} - \hat{\beta} ret_t^{S\&P500} \quad \text{for 2007-2019.}$$

[39] This data was downloaded from: `fraser.stlouisfed.org` and Haver Analytics.

In addition, the time window for cumulating returns is extended from two to three days, i.e. t_0, t_1 and t_2. Once again, the baseline results are confirmed.

Lastly, we perform a "placebo test" by selecting large movements in the stock price ratio of exporters to non-exporters in both directions, regardless of whether a trade policy statement was issued or not.[40] Hence, these movements may have been caused by other shocks (e.g., exchange rate or oil price shocks) that have differential effects on exporters and non-exporters. Substituting this series for our shock yields a lower point estimate and a less significant increase in industrial production and commercial loans (figure 35). In addition, the fall in unemployment is muted, and its downward trajectory is less persistent.

All in all, our results are highly robust to different shock aggregations, to controlling for other macroeconomic news, and to only selecting shocks with a subjectively correct sign.

6.2 Identifying shocks based on importers' stock price index

Our trade policy shock is based on the heterogeneous stock market reaction of exporting relative to non-exporting firms. To ensure that our results also hold when using an alternative definition of trade exposure, we use our own importer stock price index (as described in section 3.2). Importing firms should be impacted by trade policy changes (e.g. tariffs) initiated by the US, jointly agreed-upon trade agreements, as well as trade partners' unilateral actions that are expected to elicit retaliation by the US.

We construct the trade policy shock in the same way as described in section 4.2, but substitute the importer for the exporter basket and the non-importer for the non-exporter basket. The correlation of the two shocks is high (0.82), which is partly because many exporting firms also import.

Selected IRFs obtained by using importers' relative stock prices to identify

[40] We use stock price movements above the 99th percentile or within the 1st percentile. The former are large increases in the ratio and the latter present large falls.

shocks can be found in appendix H.2. The results are very similar to the baseline based on exporters. Hence, our results do not hinge on the particular measure of firms' trade exposure used for shock identification.

6.3 Analyzing trade policy shocks under different presidents

Our sample covers the time period of an abrupt departure from previous decades of striving towards trade liberalization due to the change of government in 2017. In an escalation of protectionist actions, the US government raised tariffs on approximately 16% of imports in 2018 and 2019 (Congressional Research Service (2020)). These triggered forceful retaliatory responses from trade partners resulting in the largest return to protectionism since the 1930s. We are therefore interested in exploring whether the shift towards protectionism has impacted the transmission of trade policy shocks onto the economy. To investigate this, we introduce a dummy that equals 1 between January 2017 and the end of the sample capturing the period of President Trump's administration and 0 otherwise. We interact this dummy with the baseline shock variable and include this as an additional regressor in our baseline equation (4). We plot the t-statistics from the null hypothesis that the interaction term is not statistically different from zero, together with the 90% acceptance interval (± 1.645) in figure 37. If the t-statistic were both positive (negative) and statistically significant, it would suggest that trade policy exerted a more (less) pronounced influence during President Trump's tenure compared to the administrations of Presidents Bush and Obama. However, as shown in figure 37, these conditions only hold for some outcome variables. While the medium-term response of industrial production and commercial loans was lower during the Trump administration, it was broadly unchanged for the other variables considered.

There are two potential explanations for the more muted responses of industrial production and commercial loans during Trump's presidency. First, commercial loans, which is a proxy for firm investment, is a forward-looking

variable in the sense that it encompasses expectations about future economic conditions. Thus, it is highly affected by uncertainty about whether trade policy changes will be implemented and maintained. The capricious nature of announcements under Trump, with frequent amendments and revocations, may have muted their response as firms adopted a "wait and see" approach. Second, the relationship between equity price movements and the macroeconomy under Trump may have weakened due to stock market overreactions. For example, the truce during the trade war with China in January 2019 led to a similar stock market response as signing the Transpacific Partnership agreement. The former, however, simply maintains the status quo - potentially not boosting industrial production and investment - whereas the latter implies major tariff changes.

6.4 Using Trump's tweets instead of official statements

We are interested in whether trade policy-relevant information disseminated through alternative communication channels has similar macroeconomic effects as official statements. To this end, we use tweets published by Donald J. Trump. In particular, we classify tweets mentioning at least one of the words "trade", "tariff", "China", or "NAFTA", and that were re-tweeted at least 20 thousand times into protectionist and liberalizing tweets.[41]

For consistency with the baseline, we start by being ex-ante agnostic about the sign of the shock. Hence, we identify a protectionist shock whenever a tweet triggers a negative return on the exporters' stock price ratio, as well as a fall in the ratio of exporters to non-exporters. A liberalizing shock is identified if the opposite stock market reactions are observed. We again aggregate the series to the monthly level and estimate the macroeconomic effects using local projections. Figure 38 shows the IRFs that should be interpreted as being caused by a liberalizing shock. Overall we find that the response of

[41] A large number of retweets ensures that the announcement received sufficient public attention and may also reflect that the information contained in the tweet caught the public by surprise, which would aid our identification of unanticipated trade news shocks.

most variables to these shocks is more muted compared to our baseline trade policy shocks. Using only "correctly" identified shocks, i.e., tweets resulting in stock price movements that are consistent with their ex-ante classification into liberalizing and protectionist, does not change this.[42] This is because, as shown in H.5, Trump's tweets do not provide added, trade policy-relevant information to the market. They are usually vague and do not mention concrete trade policy changes. Instead, President Trump frequently used Twitter as a platform to threaten and complain about trade partners. As a result, once official statements are controlled for, tweets have no significant effect on the stock return of trade-exposed firms.

7 Conclusion

In this paper, we use daily official trade policy statements by the US and its trade partners since 2007 to uncover their effects on the macroeconomy. Exploiting the fact that trade-exposed firms react more to these statements than non-trade-exposed firms, we are able to identify and quantify exogenous trade policy shocks. Furthermore, by using the local projections method introduced by Jordà (2005), we can distinguish between the effects of trade liberalizing and protectionist measures. We also look at other asymmetries, such as the difference between announcements and implementations, shocks initiated by the US or its trade partners, and finally, non-linearities in shock size.

We find that following a trade liberalizing shock (based on the baseline shock, which treats both liberalizing and protectionist measures symmetrically), firm investment, industrial production, and manufacturing sales increase. Whilst unemployment falls after the shock, the only slightly elevated hiring rate and constant hours worked, along with just a small

[42] Instead of using stock prices, we also included a shock series that takes a value of -1 (on days with protectionist tweets), +1 (for liberalizing tweets) and 0 if no trade-related tweet occurred. However, the results do not change.

increase in personal income, translate into a muted response of consumption in the short-term. When we distinguish between trade liberalizing and protectionist shocks, we find no statistically significant differences in the response of macroeconomic variables to the two shocks. This suggests that any gains from trade liberalizations are of equal magnitude to potential damage from protectionism. Comparing the responses to implementations and announcements, we find that there are differences in the credibility of the two types of shocks. Even after planned trade policy changes are announced, agents seem uncertain whether policymakers will follow through since most of the responses are muted. On the other hand, once policies have been implemented, uncertainty is dissolved, and firms and households react to these. Finally, it appears that the US economy responds more significantly to shocks initiated by its trade partners compared to domestically originated shocks.

Overall, the macroeconomic impact of trade policy seems multilayered and is subject to substantial heterogeneity depending on the type and origin of the policy change. Augmenting a traditional narrative shock identification with stock market data may help to isolate the unanticipated component and provides a simple way to quantify the size of shocks.

However, it is important to acknowledge that our shock identification method may not capture shocks with perfect precision. This is due to its reliance on the top 50 companies in the S&P 500 index with the highest and lowest international revenue share. These companies may not accurately represent the average size of US businesses, which tend to be smaller. As a result, the effect of trade policy statements on firms in the overall economy may only be captured imperfectly. Furthermore, different industries are impacted by different trade agreements or tariffs at varying times. While the firms in our international stock basket come from diverse sectors, capturing every round of policy changes with equal precision cannot be guaranteed. In addition, using the export or import propensity as a measure of trade exposure may not fully account for the intricate positions of firms within global value chains,

potentially distorting the magnitude of trade shocks.

Nevertheless, our findings can be valuable for policymakers seeking to make informed decisions about the short and medium-term impact of trade policies on the macroeconomy. For instance, as the new Trump administration introduces new tariffs against almost all trading partners with the aim of boosting US manufacturing and addressing trade imbalances, it is imperative to understand the overall impact on the US economy, as protectionist measures appear to negatively affect industrial production, trade, firm investment, and lead to increased unemployment.

References

Alessandria, G., S. Y. Khan, and A. Khederlarian (2024). Taking stock of trade policy uncertainty: Evidence from China's pre-WTO accession. *Journal of International Economics 150*, 103938.

Amiti, M., S. H. Kong, and D. Weinstein (2020). The Effect of the U.S.-China Trade War on Investment. *NBER working paper series 27114*.

Amiti, M., S. J. Redding, and D. E. Weinstein (2019). The impact of the 2018 tariffs on prices and welfare. *Journal of Economic Perspectives 33*(4), 187–210.

Baker, S. R., N. Bloom, and S. J. Davis (2016). Measuring Economic Policy Uncertainty. *The Quarterly Journal of Economics 131*(4), 1593–1636.

Baker, S. R., N. Bloom, S. J. Davis, and K. J. Kost (2019). Policy News and Stock Market Volatility. *Revise & Resubmit, Journal of Financial Economics*.

Barattieri, A. and M. Cacciatore (2023, April). Self-Harming Trade Policy? Protectionism and Production Networks. *American Economic Journal: Macroeconomics 15*(2), 97–128.

Barattieri, A., M. Cacciatore, and F. Ghironi (2021). Protectionism and the Business Cycle. *Journal of International Economics*.

Bernard, A. B., J. B. Jensen, and P. K. Schott (2009). Importers, Exporters and Multinationals: A Portrait of Firms in the U.S. that Trade Goods. In *Importers, Exporters and Multinationals: A Portrait of Firms in the U.S. that Trade Goods. T. Dunne, JB Jensen, and MJ Roberts (eds.), Cambridge, MA*.

Boer, L. and M. Rieth (2024). The macroeconomic consequences of import tariffs and trade policy uncertainty. Technical Report WP/24/13, International Monetary Fund.

Boer, L., M. Rieth, and L. Menkhoff (2023). The multifaceted impact of u.s. trade policy on financial markets. *Journal of Applied Econometrics 38*(3), 388–406.

Bohara, A. K. . and W. H. . Kaempfer (2016). A Test of Tariff Endogeneity in the United States. *American Economic Review 81*(4), 952–960.

Brugnolini, L. (2018). About Local Projection Impulse Response Function Reliability. *CEIS Research Paper 440*.

Caldara, D., M. Iacoviello, P. Molligo, A. Prestipino, and A. Raffo (2020). The economic effects of trade policy uncertainty. *Journal of Monetary Economics 109*, 38–59.

Chauvet, M. and J. M. Piger (2020). Smoothed U.S. Recession Probabilities, retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/RECPROUSM156N, May 19, 2020.

Congressional Research Service (2020). Escalating U . S . Tariffs : Affected Trade. *CRS Insight*.

Davis, S. J. and C. Seminario (2019). Diagnosing the Stock Market Reaction to Trump's Surprise Election Victory. *In progress*.

Egger, P. and J. Zhu (2019). The U.S.-Chinese Trade War: an Event Study of Stock-Market Responses. *CEPR Discussion Paper DP14164*.

Fajgelbaum, P. D., P. K. Goldberg, P. J. Kennedy, and A. K. Khandelwal (2020). The return to protectionism. *Quarterly Journal of Economics 135*, 1–55.

Fernald, J. (2014). A quarterly, utilization-adjusted series on total factor productivity. *Federal Reserve Bank of San Francisco Working Paper 2012-19*.

Fisher, J. D. M. and R. Peters (2010). Using Stock Returns To Identify Government Spending Shocks. *The Economic Journal 120*(544), 414–436.

Greenland, A., M. Ion, J. Lopresti, and P. K. Schott (2024). Using equity market reactions to infer exposure to trade liberalization. *Journal of International Economics 152*, 104000.

Hamilton, J. D. (2003). What is an Oil Shock? *Journal of Econometrics 113*(2), 363–398.

Handley, K. and N. Limão (2017). Policy uncertainty, trade, and welfare: Theory and evidence for China and the United States. *American Economic Review 107*(9), 2731–2783.

Hassan, T. A., S. Hollander, L. Van Lent, and A. Tahoun (2019). Firm-level Political Risk: Measurement and Effects. *Quarterly Journal of Economics*, 2135–2202.

Hassan, T. A., S. Hollander, L. van Lent, and A. Tahoun (2024). The Global Impact of Brexit Uncertainty. *Journal of Finance 79*(1), 413–458.

Hoberg, G. and S. K. Moon (2017). Offshore Activities and Financial vs Operational Hedging. *Journal of Financial Economics 125*(2), 217–244.

Huang, Y., C. Lin, S. Liu, and H. Tang (2019). Trade Linkages and Firm Value: Evidence from the 2018 US-China 'Trade War'. *CEPR Discussion Paper DP14173*.

Jordà, Ò. (2005). Estimation and Inference of Impulse Responses by Local Projections. *American Economic Review 95*(1), 161–182.

Metiu, N. (2021). Anticipation effects of protectionist u.s. trade policies. *Journal of International Economics 133*, 103536.

Moser, C. and A. K. Rose (2014). Who benefits from regional trade agreements? the view from the stock market. *European Economic Review 68*, 31–47.

Newey, W. K. and K. D. West (1987). A Simple, Positive Semi-Definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix. *Econometrica 55*(3), 703–708.

Pástor, L. and P. Veronesi (2013). Political Uncertainty And Risk Premia. *Journal of Financial Economics 110*, 520–545.

Ramey, V. A. and S. Zubairy (2018). Government spending multipliers in good times and in bad: Evidence from US historical data. *Journal of Political Economy 126*(2), 850–901.

Romer, C. D. and D. H. Romer (2004). A New Measure of Monetary Shocks: Derivation and Implications. *American Economic Review 94*(4), 1055–1084.

Rose, A. K. (2013). The march of an economic idea? Protectionism isn't counter-cyclic (anymore). *Economic Policy 28*(76), 571–612.

Taylor, J. B. (1993). Discretion versus policy rules in practice. *Carnegie-Rochester Confer. Series on Public Policy 39*, 195–214.

UN Comtrade (2017). Data on u.s. exports downloaded from https://oec.world/en/visualize/tree_map/hs92/export/usa/all/show/2017/, may 1, 2020.

Wagner, A. F., R. J. Zeckhauser, and A. Ziegler (2018). Company Stock Price Reactions to the 2016 Election Shock: Trump, Taxes, and Trade. *Journal of Financial Economics 130*(2), 428–451.

Waugh, M. E. (2020). The Consumption Response To Trade Shocks : Evidence From the US-China Trade War. *NBER Working Paper* (26353).

A Data Definitions and Sources

Table 3: Data Definitions and Sources

Variable	Source (Code)	Details
Stock market data		
International Stock Price Index	Goldman Sachs/Bloomberg (GSTHINTL)	Daily index based on the stock price of the 50 S&P 500 companies across 11 sectors with the highest international sales based on the geographical breakdown reported in 10-K filings (detailed financial report that public companies have to submit to the US Securities and Exchange Commission (SEC))
Domestic Stock Price Index	Goldman Sachs/Bloomberg (GSTHAINT)	Daily index based on the stock price of the 50 S&P 500 companies across 11 sectors with the highest domestic revenue exposure based on the geographical breakdown reported in 10-K filings.
S&P 500 index	Yahoo Finance	Daily
VIX	Cboe	Monthly, measures market expectation of volatility based on S&P 500 option prices
Macroeconomic data		
Ind. production	FRED (INDPRO)	Monthly, seasonally adjusted
Ind. prod.: Manufacturing	FRED (IPMAN)	Monthly, seasonally adjusted
Ind. prod.: Consumer goods	FRED (IPCONGD)	Monthly, seasonally adjusted
Ind. prod.: Durable Cons. Goods	FRED (IPDCONGD)	Monthly, seasonally adjusted
Ind. prod.: Non-durables	FRED (IPNCONGD)	Monthly, seasonally adjustedy
Ind. prod.: Construction supply	FRED (IPB54100S)	Monthly, seasonally adjusted
Ind. prod.: Final goods	FRED (IPB50002N)	Monthly, seasonally adjusted
Manufacturing industries sales	BLS	Monthly, seasonally adjusted
Federal Funds Rate	FRED (FEDFUNDS)	Monthly
Broad Dollar Index	FRED (TWEXBMTH)	Monthly
Global Price Index of All Commodities	FRED/IMF (PALLFNFINDEXM)	Index 2016 = 100, Monthly

Table 3: Data Definitions and Sources (continued)

Variable	Source	Details
Macroeconomic data (continued)		
CPI (Total All Items)	FRED (CPALTT01USM661S)	Monthly
PPI (all commodities)	FRED/BLS (PPIACO)	Monthly
Exports of goods and services	Census	Monthly, deflated, seasonally adjusted, in per capita terms
Imports of goods and services	Census	Monthly, deflated, seasonally adjusted, in per capita terms
Consumption of goods	BLS	Monthly, seasonally adjusted, in per capita terms
Consumption of durable goods	BLS	Monthly, seasonally adjusted, in per capita terms
Consumption of nondurable goods	BLS	Monthly, seasonally adjusted, in per capita terms
Unemployed rate	FRED (UNRATE)	Monthly, seasonally adjusted
Population	FRED (POPTHM)	Monthly
Hire rate (hires/employed)	Fred/BLS (JTSHIR)	Monthly
Commercial and Industrial Loans	FRED/Federal Reserve Board	Monthly, seasonally adjusted, in per capita terms
Consumer Loans	FRED/Federal Reserve Board	Monthly, seasonally adjusted, in per capita terms
Other variables used for Granger causality tests		
GDP deflator	Congressional Budget Office	Quarterly, Chain Price Index (2012=1), seasonally adjusted
Effective federal funds rate	Congressional Budget Office	Quarterly, % p.a.
Natural Rate ($r*$)	Holsten et al. (2017)	Quarterly, Final data point: 2019Q2
Total factor productivity	Fernald (2012)	Quarterly, Utilization-adjusted, percent change at an annual rate (=400 * change in natural log), Final data point: 2019Q2
Oil shock	Hamilton (2003)	Quarterly, Final data point: 2019Q2
Recession probability	Piger/ FRED (RECPROUSM156N)	Monthly, Smoothed US Recession Probabilities obtained from a dynamic-factor markov-switching model originally proposed by Chauvet (1998) and applied to monthly data for non-farm payroll employment, real personal income excluding transfer payments, the index of industrial production, and real manufacturing and trade sales

Table 3: Data Definitions and Sources (continued)

Variable	Source	Details
Other variables used for Granger causality tests (continued)		
Coincident Economic Activity Index	Philadelphia Fed/ FRED (USPHCI)	Monthly, seasonally adjusted, based four indicators: the unemployment rate, non-farm payroll employment, average hours worked in manufacturing and wages and salaries
PMI Composite Index	ISM-Manufacturing	Monthly, Purchasing Manager's Index based on a survey of purchasing managers and supply management executives, PMI>50: expansion of the manufacturing sector compared with the previous month, PMI>50:no change, PMI<50: contraction of the manufacturing sector
Chicago Fed National Activity Index	Chicago Fed/ FRED (CFNAI)	Monthly, CFNAI=0: economy is expanding at its historical trend rate of growth, CFNAI<0: below-average growth; CFNAI>0: above-average growth
Macroeconomic Uncertainty	Jurado et al. (2015)	Monthly, extract common variation in uncertainty from hundreds of macroeconomic indicators, reflects uncertainty around forecasts, rather than perceptions by market participants
Financial Uncertainty	Jurado et al. (2015)	Monthly, extract common variation in uncertainty from hundreds of financial indicators, reflects uncertainty around forecasts, rather than perceptions by market participants
Economic Policy Uncertainty (EPU)	Baker et al. (2016)	Monthly, based on the frequency of key words mentioned in US newspapers such as "uncertainty" or "economic" and "Congress", "deficit", "Federal Reserve", "legislation", etc.
Trade Policy Uncertainty (EPU Trade)	Baker et al. (2016)	Monthly, based on the frequency of key words mentioned in US newspapers such as "uncertainty", "tariff" and "war"

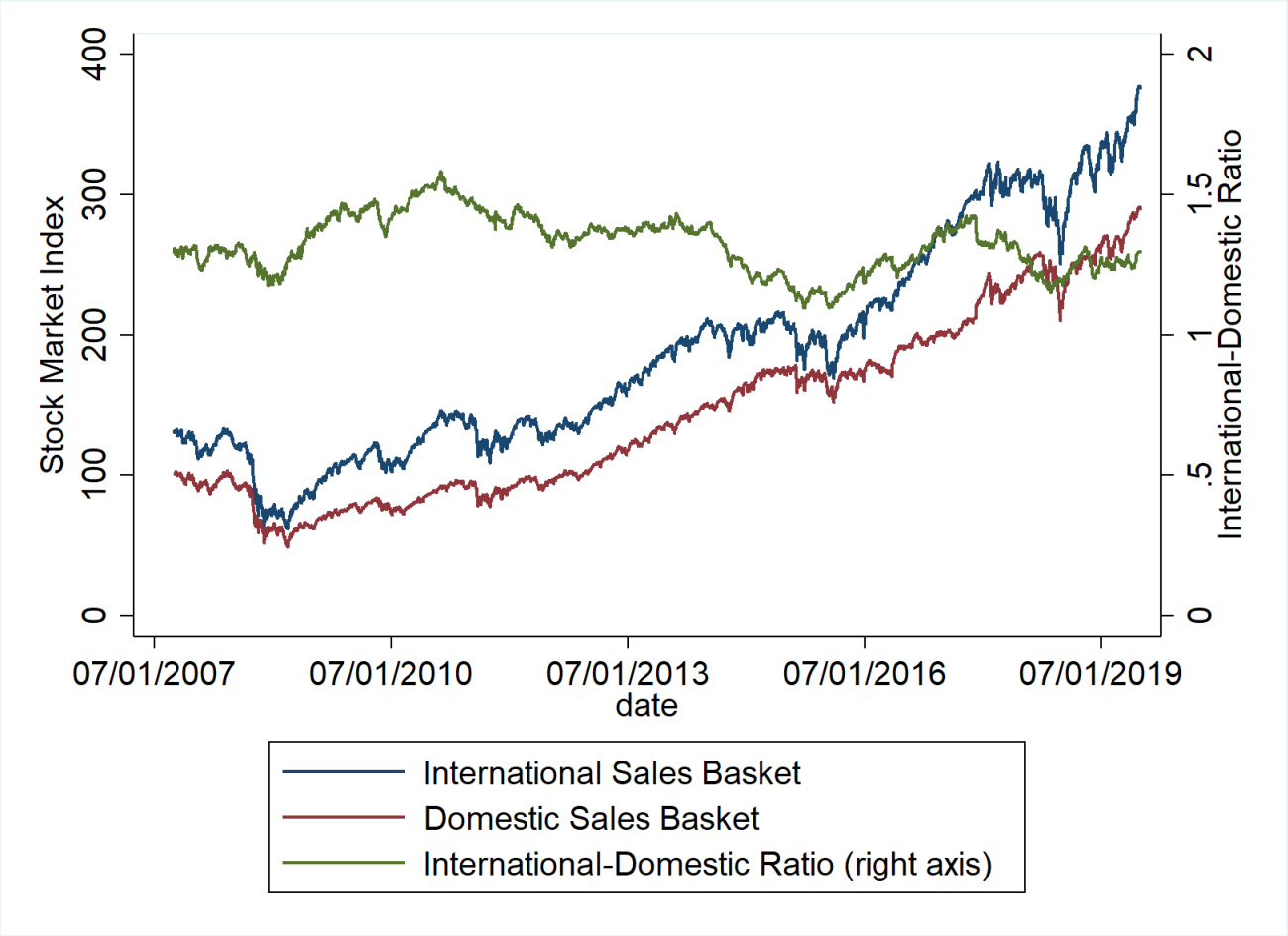


Figure 5: Stock price indices of the 50 S&P 500 firms with the highest and lowest international sales (left axis) and their ratio (right axis)

B Trade policy statements and identified shocks

B.1 Trade policy statements

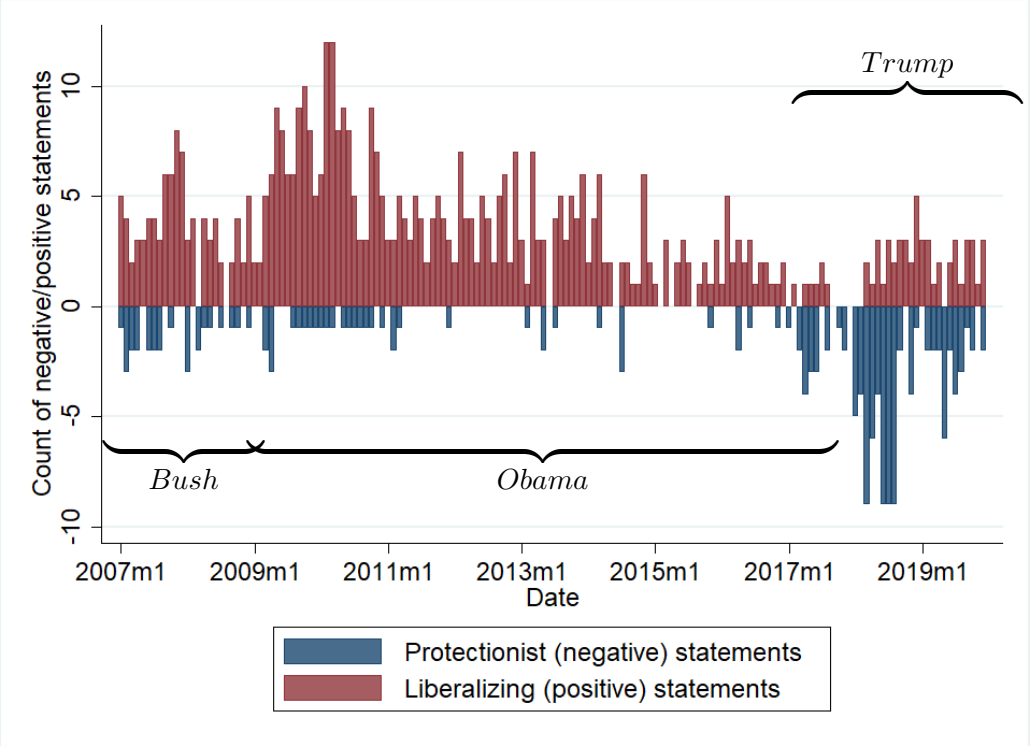


Figure 6: Number of **major and minor** trade policy statements by sign, aggregated to the monthly frequency.

B.2 Identified trade policy shocks

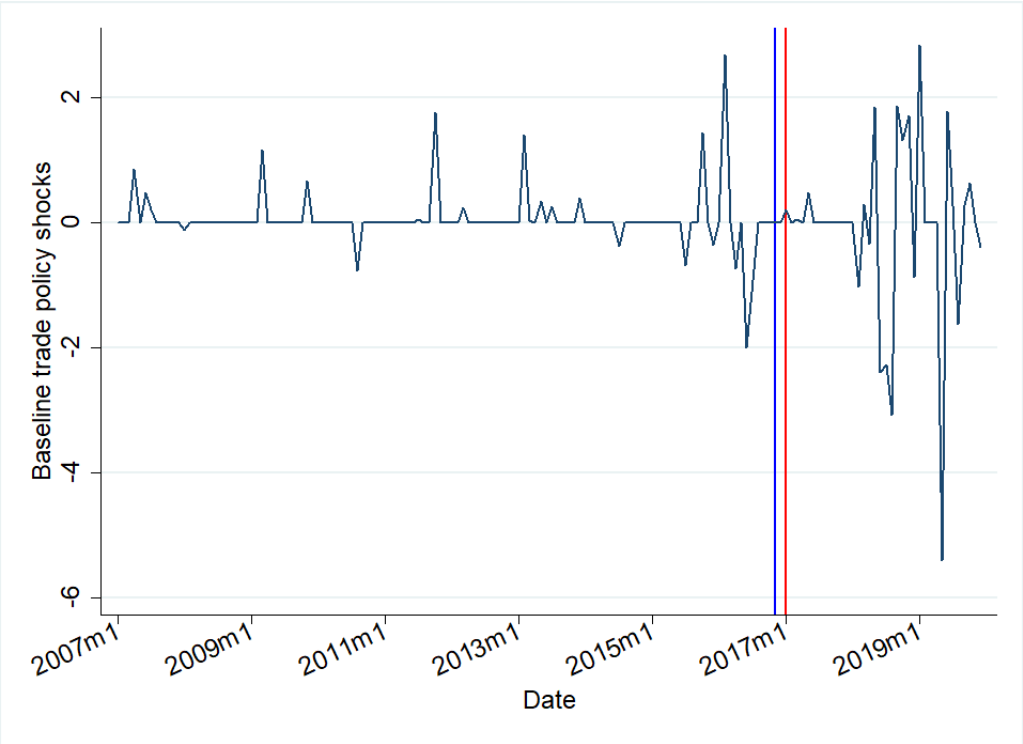


Figure 7: **Monthly** baseline trade policy shocks. The vertical lines represent the day on which the 2016 election results were announced (blue) and President Trump took office (red).

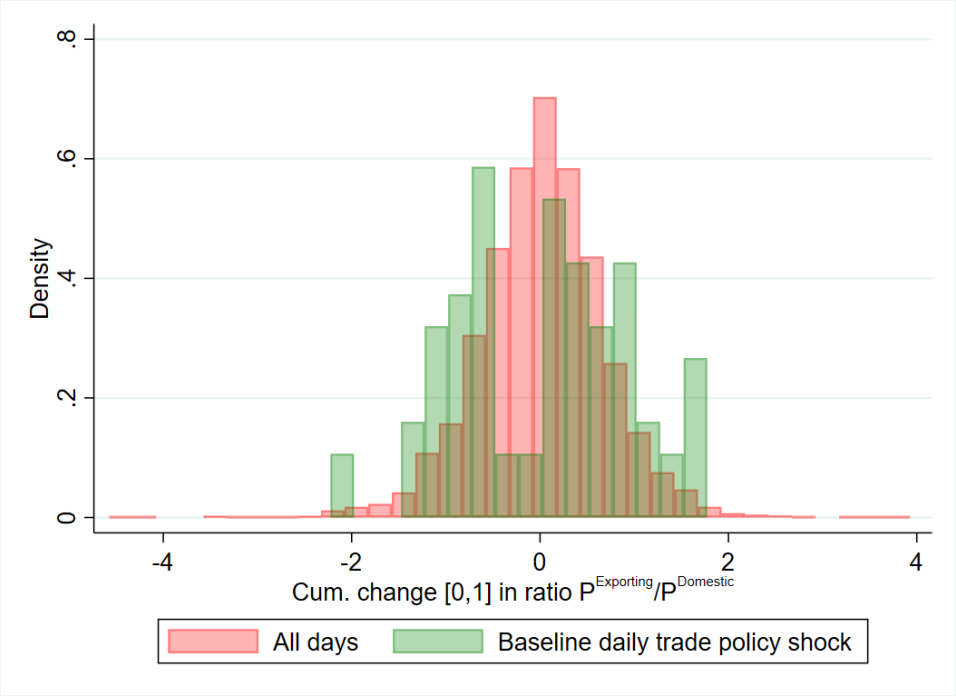


Figure 8: Distribution of baseline trade policy shocks at the **daily** frequency.

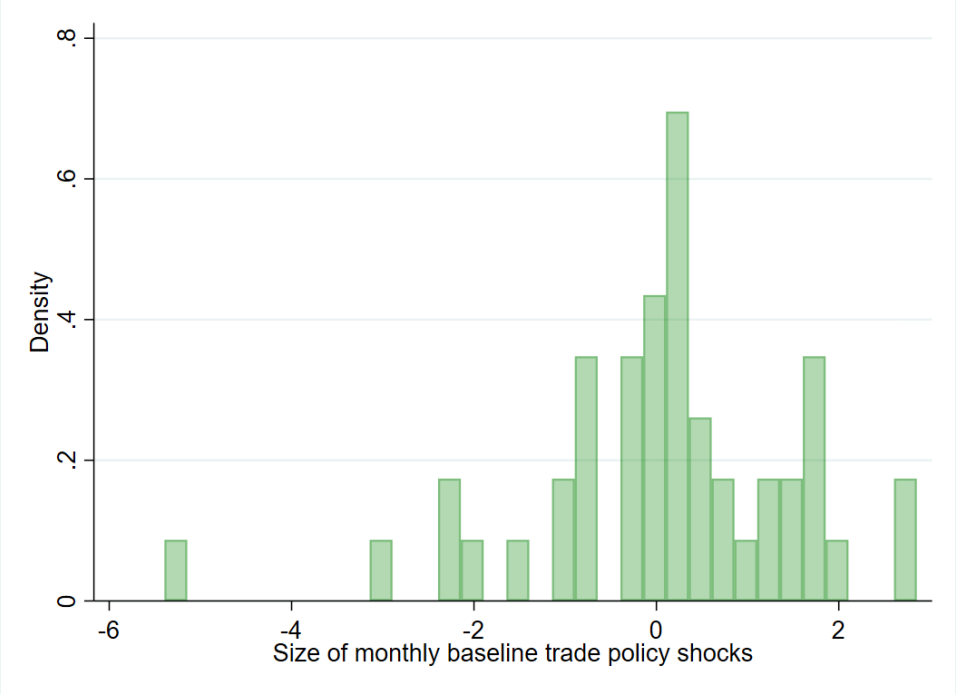
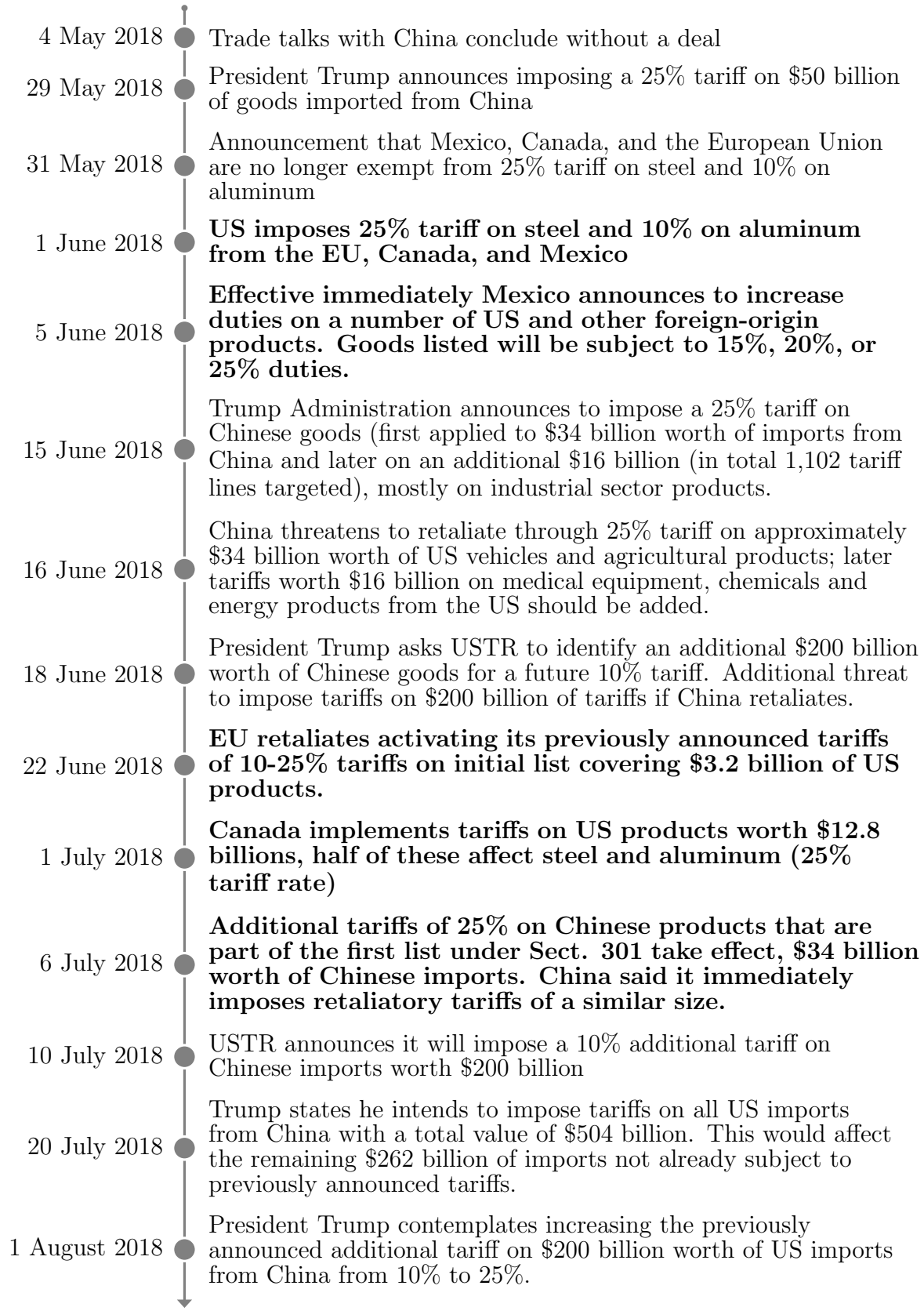


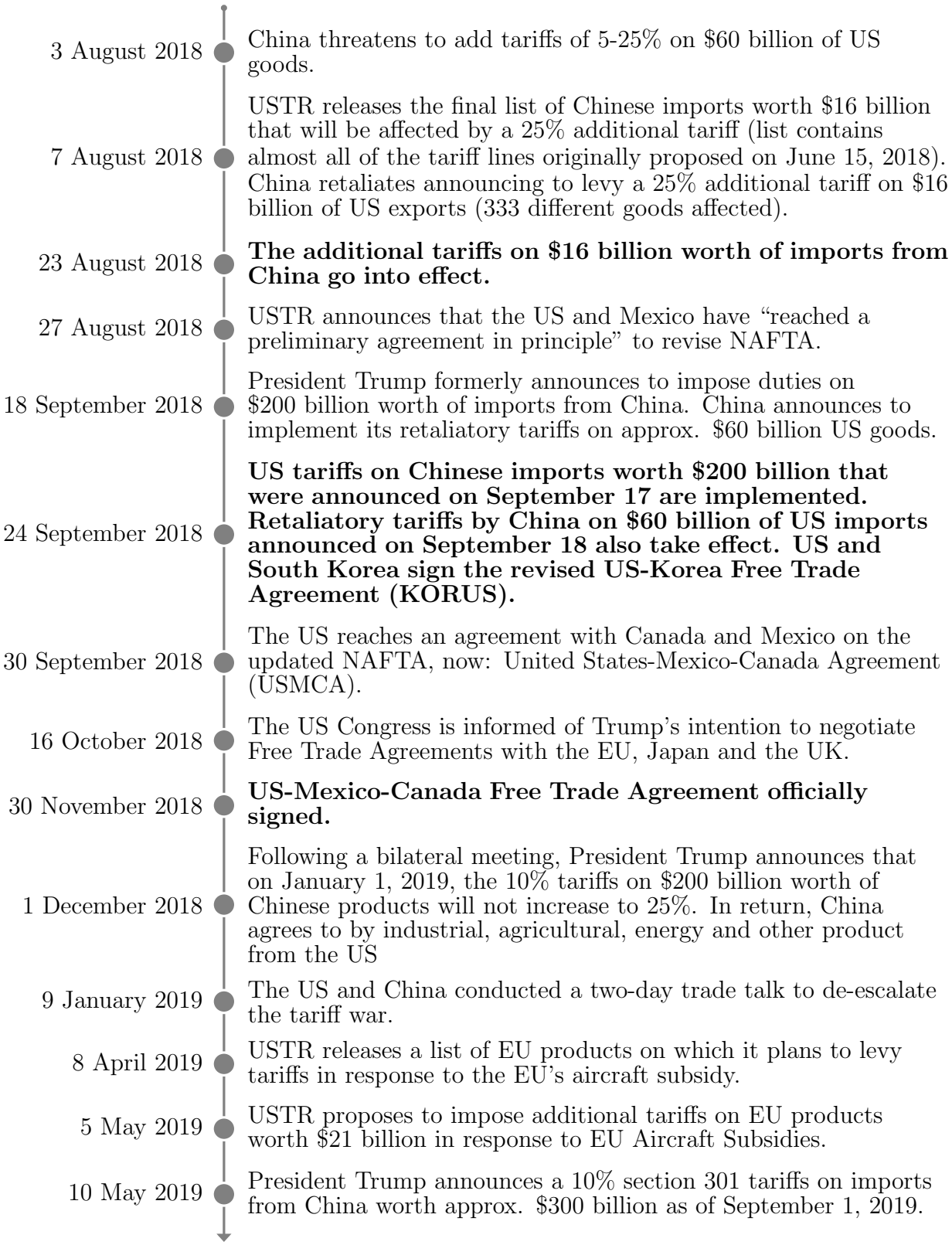
Figure 9: Distribution of baseline trade policy shocks at the **monthly** frequency.

C Timeline of selected major trade policy events, January 2007 - August 2019

Note: Trade policy implementations and formal approvals are written in **bold**.


24 July 2015
US leads WTO expansion of the Information Technology Agreement
16 December 2015
US and WTO members announce final agreement on expanding the Information Technology Agreement
3 February 2016
Trans-Pacific Partnership agreement signed
17 February 2016
US and ASEAN Trade Ministers agree on strengthening trade ties
29 February 2016
Successful T-TIP round in Brussels yields proposed text in the vast majority of negotiating areas
23 June 2016
UK voted to leave the EU (with implications for the UK-US tariff rates applied in the future)
1 July2016
US and WTO partners start implementing the expanded Information Technology Agreement
23 January 2017
Trump announces withdrawal from the Trans-Pacific Partnership Negotiations and Agreement
22 February 2017
WTO Trade Facilitation Agreement (TFA) entered into force
18 May 2017
The US Congress is notified by Trade Representative Robert Lighthizer that President Trump intends to renegotiate NAFTA
1 March 2018
Trump announces tariffs on all trading partners except Mexico and Canada of 25% on steel and 10% on aluminum
7 March 2018
The EU announces contingent retaliatory tariffs in case the US follows through with tariffs (25% tariff on $3.4 billion of US exports)
22 March 2018
President Trump directs US Trade Representative to impose tariffs (under Section 301 investigation) on Chinese imports worth approx. $50 billion
23 March 2018
25% on steel and 10% on aluminum tariffs take effect; China proposes $3 billion of US imports subject to retaliation under Sec. 232
28 March 2018
Announcement that US and South Korea have agreement on a revised US-South Korea Free Trade Agreement
2 April 2018
China retaliates with 15-25% tariffs affecting US exports $2.4 billion
3 April 2018
Trump releases list of 1,333 Chinese products worth $50 billion that will potentially hit by a 25% tariffs, which covers $46.2 billion of US imports
4 April 2018
China publishes list of 106 products subject to forthcoming 25% tariffs in retaliation to the US Section 301 tariffs, covering $50 billion of Chinese imports from the US
5 April 2018
President Trump announces having instructed the USTR to investigate possibility of levying $100 billion additional retaliatory tariffs on China


4 May 2018
Trade talks with China conclude without a deal
29 May 2018
President Trump announces imposing a 25% tariff on $50 billion of goods imported from China
31 May 2018
Announcement that Mexico, Canada, and the European Union are no longer exempt from 25% tariff on steel and 10% on aluminum
1 June 2018
US imposes 25% tariff on steel and 10% on aluminum from the EU, Canada, and Mexico
5 June 2018
Effective immediately Mexico announces to increase duties on a number of US and other foreign-origin products. Goods listed will be subject to 15%, 20%, or 25% duties.
15 June 2018
Trump Administration announces to impose a 25% tariff on Chinese goods (first applied to $34 billion worth of imports from China and later on an additional $16 billion (in total 1,102 tariff lines targeted), mostly on industrial sector products.
16 June 2018
China threatens to retaliate through 25% tariff on approximately $34 billion worth of US vehicles and agricultural products; later tariffs worth $16 billion on medical equipment, chemicals and energy products from the US should be added.
18 June 2018
President Trump asks USTR to identify an additional $200 billion worth of Chinese goods for a future 10% tariff. Additional threat to impose tariffs on $200 billion of tariffs if China retaliates.
22 June 2018
EU retaliates activating its previously announced tariffs of 10-25% tariffs on initial list covering $3.2 billion of US products.
1 July 2018
Canada implements tariffs on US products worth $12.8 billions, half of these affect steel and aluminum (25% tariff rate)
6 July 2018
Additional tariffs of 25% on Chinese products that are part of the first list under Sect. 301 take effect, $34 billion worth of Chinese imports. China said it immediately imposes retaliatory tariffs of a similar size.
10 July 2018
USTR announces it will impose a 10% additional tariff on Chinese imports worth $200 billion
20 July 2018
Trump states he intends to impose tariffs on all US imports from China with a total value of $504 billion. This would affect the remaining $262 billion of imports not already subject to previously announced tariffs.
1 August 2018
President Trump contemplates increasing the previously announced additional tariff on $200 billion worth of US imports from China from 10% to 25%.


3 August 2018
China threatens to add tariffs of 5-25% on $60 billion of US goods.
7 August 2018
USTR releases the final list of Chinese imports worth $16 billion that will be affected by a 25% additional tariff (list contains almost all of the tariff lines originally proposed on June 15, 2018). China retaliates announcing to levy a 25% additional tariff on $16 billion of US exports (333 different goods affected).
23 August 2018
The additional tariffs on $16 billion worth of imports from China go into effect.
27 August 2018
USTR announces that the US and Mexico have "reached a preliminary agreement in principle" to revise NAFTA.
18 September 2018
President Trump formerly announces to impose duties on $200 billion worth of imports from China. China announces to implement its retaliatory tariffs on approx. $60 billion US goods.
24 September 2018
US tariffs on Chinese imports worth $200 billion that were announced on September 17 are implemented. Retaliatory tariffs by China on $60 billion of US imports announced on September 18 also take effect. US and South Korea sign the revised US-Korea Free Trade Agreement (KORUS).
30 September 2018
The US reaches an agreement with Canada and Mexico on the updated NAFTA, now: United States-Mexico-Canada Agreement (USMCA).
16 October 2018
The US Congress is informed of Trump's intention to negotiate Free Trade Agreements with the EU, Japan and the UK.
30 November 2018
US-Mexico-Canada Free Trade Agreement officially signed.
1 December 2018
Following a bilateral meeting, President Trump announces that on January 1, 2019, the 10% tariffs on $200 billion worth of Chinese products will not increase to 25%. In return, China agrees to by industrial, agricultural, energy and other product from the US
9 January 2019
The US and China conducted a two-day trade talk to de-escalate the tariff war.
8 April 2019
USTR releases a list of EU products on which it plans to levy tariffs in response to the EU's aircraft subsidy.
5 May 2019
USTR proposes to impose additional tariffs on EU products worth $21 billion in response to EU Aircraft Subsidies.
10 May 2019
President Trump announces a 10% section 301 tariffs on imports from China worth approx. $300 billion as of September 1, 2019.


13 May 2019
China announces tariff retaliation on $75 billion worth of imported goods (5%-10% tariff rate) which will take effect in two steps on 1 September 2019 and on 15 December 2019. In response, President Trump intends to increase the tariffs on approx. $550 billion worth of Chinese imports by 5%. For the 25% tariffs on approx. $250 billion worth of Chinese imports, tariffs will increase to 30%, effective October 1. The 10% tariffs on approx. $300 billion worth of Chinese imports announced earlier would be implemented at a higher rate (15%).
17 May 2019
Trump intends to increase the 10% section 301 tariffs on $200 billion imports from China to 25% and threatens to impose tariffs on all remaining imports from China.
30 May 2019
The Trump Administration officially increases tariffs on $200 billion imports from China to 25%.
1 June 2019
China announces to increase its retaliatory tariff on US exports worth $60 billion
1 July 2019
The Trump administration suggests that certain automobiles and automobile parts represent a threat to national security and that their imports need to be limited. Additionally, it is announced that the Section 232 tariffs on Canadian and Mexican steel and aluminum are removed. In return, Canada and Mexico agree to removing their retaliatory tariffs.
1 August 2019
President Trump announces his intent to impose gradually increasing tariffs on all imports from Mexico starting on June 10, 2019 (first 5%, then 10%, then 15%, then 20%, then 25%).
23 August 2019
China raises tariffs on $60 billion of US goods as announced on May 13.

D Examples of firms included in the International and Domestic Exposure baskets

Table 4: Example companies and sectors included in **Domestic** sales basket.

Company name	**NAICS 1 classifcation**
Domestic sales basket	
Aetna Inc	Insurance Agencies and Brokerages
Allstate Corp	Insurance Agencies and Brokerages
Altria Group Inc	Other Farm Product Raw Material Merchant Wholesalers
Anthem Inc	Direct Life Insurance Carriers
AutoZone Inc	Automotive Parts and Accessories Stores
BB&T Corp	Commercial Banking
Centene Corp	All Other Miscellaneous Ambulatory Health Care Services
Charles Schwab	Investment Advice
CSX Corp	Line-Haul railroads
CVS Health Corp	Insurance Agencies and Brokerages
Dollar General	Supermarkets and Other Grocery Stores
Dominion Resources	Other Electric Power Generation
Fiserv Inc	Custom Computer Programming Services
Fox Corp	Television Broadcasting Stations
J.B. Hunt Transport Services Inc	Freight Transportation Arrangement
Kroger Co.	Supermarkets and Other Grocery Stores
Lowe's Companies Inc	Home Centers
Marathon Petroleum Corp	Petroleum and Petroleum Products Merchant Wholesalers
Norfolk Southern Corp	Freight Transportation Arrangement
Nucor Corp	Fabricated Structural Metal Manufacturing
Paychex Inc	Payroll Services
PNC Financial Svc. Grp	Commercial Banking
Public Storage	General Warehousing and Storage
Ross Stores Inc	Department Stores
Southern Co	Other Electric Power Generation
SunTrust Banks Inc	Commercial Banking
T-Mobile US Inc	All Other Telecommunications
U.S. Bancorp	Commercial Banking
Verizon Communications Inc	Telephone Communications
Wells Fargo And Company	Commercial Banking

Table 5: Example companies and sectors included in **International** sales basket.

Company name	**NAICS 1 classifcation**
International sales basket	
Abbott Laboratories	In-Vitro Diagnostic Substance Manufacturing
AES Corp	Other Electric Power Generation
Aflac Inc	Insurance Agencies and Brokerage
Alphabet Inc	Custom Computer Programming Services
Aon Corp	Insurance Agencies and Brokerages
Boeing	Aircraft manufacturing
Baker Hughes	Oil and Gas Field Machinery and Equipment Manufacturing
Citigroup Inc	Comercial Banking
Colgate-Palmolive	Soap and Other Detergent Manufacturing
Coty Inc	Drugs and Druggists' Sundries Merchant Wholesalers
Danaher Corp	Instruments and Related Products Manufacturing for Measuring, Displaying, and Controlling Industrial Process Variables
Facebook Inc	Web Search Portals and All Other Information Services
General Electric	Turbine and Turbine Generator Set Units Manufacturing
Intel Corp	Semiconductor and Related Device Manufacturing
Internat. Flavors And Fragrances Inc	Miscellaneous Chemical Product and Preparation Manufacturing
McDonald's Corp	Full-Service Restaurants
Mettler Toledo International Inc	Analytical Laboratory Instrument Manufacturing
Microchip Technology	Semiconductor and Related Device Manufacturing
Mondelez Intl	Cheese Manufacturing
Newmont Mining Corp	All Other Metal Ore Mining
Philip Morris Intl	Tobacco Manufacturing
Priceline	Travel agencies
QUALCOMM Inc	Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing
TechnipFMC	Oil and Gas Field Machinery and Equipment Manufacturing
Texas Instruments	Semiconductor and Related Device Manufacturing
Tiffany And Co	Jewelry Stores
United Technologies Corp	Office Administrative Services
Westinghouse Air Break Technologies	Railroad Rolling Stock Manufacturing
Wynn Resorts	Hotels (except Casino Hotels) and Motels
3M Co	Surgical and Medical Instrument Manufacturing

E Examples of trade policy statements that are not unequivocally liberalizing or protectionist

This section provides the rationale for being ex-ante agnostic about the sign of our shocks. There are at least three types of situations in which classification into liberalizing and protectionist is difficult.

First, some announcements and implementations contain only slight but potentially important departures from previous announcements. For example, on April 30, 2018, President Trump voiced his intention to follow through with the previously announced punitive tariffs on steel and aluminum imports. However, Mexico, Canada, and the EU would be exempt until the end of May 2018 to allow for further negotiations. It is unclear whether markets are now upset that the initial threat will be realized or whether they are relieved that large trade partners are initially excluded. Hence, the difficulty in classifying statements may be due to a lack of information on the market's prior expectations. Similarly, there are statements announcing to follow through with a tariff but at a lower rate than previously stated.

Second, on some days, several statements are issued, which may offset each other. For example, on May 17, 2019, President Trump announced that tariffs on Canadian and Mexican steel and aluminum would be removed. Simultaneously, the US administration declared that some automobiles and automobile parts threatened national security. The statement further says that talks with the EU, Japan, and other trade partners would be held to ask them to reduce their auto exports. It is difficult to judge which of these two statements dominates.

Third, statements that refer to the US filing WTO complaints about trade partners' policies could be protectionist as they may lead to retaliations and

could ultimately culminate in a trade war. However, they could also be liberalizing if the complaint is justified and leads trade partners to remove the barrier, which opens up the market to US exporters.

F Examples of liberalizing, protectionist and unclassified official statements

1. Trade liberalizing official statement

   "**US, EU Announce Decision to Launch Negotiations on a Transatlantic Trade and Investment Partnership.** We, the Leaders of the United States and the European Union, are pleased to announce that, based on recommendations from the US-EU High Level Working Group on Jobs and Growth co-chaired by United States Trade Representative Kirk and European Trade Commissioner De Gucht, the United States and the European Union will each initiate the internal procedures necessary to launch negotiations on a Transatlantic Trade and Investment Partnership. (...)" (The White House, 13.02.2013)

2. Protectionist official statement

   "**Under Section 301 Action, USTR Releases Proposed Tariff List on Chinese Products.**

   As part of the US response to China's unfair trade practices related to the forced transfer of US technology and intellectual property, the Office of the US Trade Representative (USTR) today published a proposed list of products imported from China that could be subject to additional tariffs. (...) Sectors subject to the proposed tariffs include industries such as aerospace, information and communication technology, robotics, and machinery. The proposed list covers approximately 1,300 separate tariff lines and will undergo further review in a public notice and comment process, including a hearing. (...)" (Office of the US Trade Representative, 03.04.2018)

3. Unclassified (neither protectionist nor liberalizing) statements

   [Alteration of previously announced imposition of punitive tariffs on steel]

   "**Presidential Proclamation Adjusting Imports of Steel into the United States.**

   In Proclamation 9705 of March 8, 2018 (Adjusting Imports of Steel Into the United States), I concurred in the Secretary's finding that steel mill articles are being imported into the United States in such quantities and under such

circumstances as to threaten to impair the national security of the United States, and decided to adjust the imports of steel mill articles (...) by imposing a 25 percent ad valorem tariff on such articles imported from all countries except Canada and Mexico. (...) Recognizing that each of these countries and the EU has an important security relationship with the United States, I determined that the necessary and appropriate means to address the threat to national security posed by imports of steel articles from these countries was to continue the ongoing discussions and to exempt steel articles imports from these countries from the tariff proclaimed in Proclamation 9705 until May 1, 2018." (The White House, 30.04.2018)

F.1 Testing for trade policy shock exogeneity

As described in section 4.3, the fact that conventional monetary policy shocks are not yet available for recent time periods, forces us to build our own series. We do so by estimating the standard Taylor rule

$$i_t = r* + \pi_t + \alpha_\pi(\pi_t - \pi*) + \alpha_y(y_t - y*), \tag{7}$$

where i_t is the interest rate set by the central bank. $r*$ denotes the long-run equilibrium interest rate, π_t the rate of inflation, $\pi*$ the inflation target, y_t output measured by the log of real GDP and $y*$ the potential output. Equation (7) is estimated for the pre-sample period 1961Q1-2006Q4 using data on the equilibrium interest rate from Holsten et al. (2017). Estimates of the output gap, the GDP deflator and federal funds rates are from the Congressional Budget Office. The estimated coefficients $\hat{\alpha_\pi}$ and $\hat{\alpha_y}$ are then used for predicting interest rates for 2007Q1-2019Q2. Deviations of the realized federal funds rate from our predicted values are used as monetary shocks. To verify the robustness of our Granger causality tests we also estimate the Taylor rule for different sub-samples. Furthermore, we construct a second shock series by using equal weights for the output and inflation gaps, i.e. $\alpha_\pi = \alpha_y = 0.5$, as originally suggested by Taylor (1993). Both shock series bear the shortcoming that they may be inaccurate since interest rates were constrained by the zero lower bound after the Great Recession.

Table 6: Orthogonality between trade policy shocks and external macroeconomic shocks, current, past and future economic conditions

Instruments	**Correlation**	(p-value)	**Granger F-test**	(p-value)
Macroeconomic shocks				
TFP growth shocks[a]	0.0382	(0.7925)	1.3589	(0.2678)
Oil price shock shocks[b]	-0.0627	(0.6655)	1.5742	(0.2189)
Terms of trade shocks[c]	-0.0500	(0.5418)	0.32807	(0.7209)
Monetary policy shocks I.[d]	-0.1005	(0.4827)	1.4446	(0.2468)
Monetary policy shocks II.[e]	0.2689	(0.0564)	2.181	(0.1250)
Current/past economic conditions				
Unemployment rate	0.1029	(0.2072)	1.4265	(0.2435)
Growth in industrial production	-0.1442	(0.0774)	0.79187	(0.4550)
Recession probability	0.0301	(0.7123)	0.0607	(0.9411)
Economic Activity Index (Growth)	-0.0044	(0.9575)	1.5475	(0.2163)
PMI Composite Index	-0.0804	(0.3249)	0.65687	(0.5200)
Chicago Fed Nat. Activity Index	-0.0926	(0.2566)	0.90597	(0.4064)
Expected future economic conditions				
Consumer confidence (Univ. of Michigan)	-0.1155	(0.1566)	1.0117	(0.3662)
Business confidence (OECD)	-0.0779	(0.3400)	0.47563	(0.6225)
Real oil price[f]	0.0213	(0.7947)	1.2605	(0.2866)
S&P500 return	0.0352	(0.6676)	3.4949*	(0.0330)
Uncertainty				
Macroecon. uncertainty (Jurado et al.)	0.0625	(0.4476)	0.22939	(0.7953)
Financial uncertainty (Jurado et al.)	0.0234	(0.7766)	0.6776	(0.5095)
VIX[k]	0.075	(0.3549)	2.7497*	(0.0673)
EPU (Baker et al.)	0.0336	(0.6815)	0.52118	(0.5949)
EPU Trade → Trade policy shock	-0.2837***	(0.0004)	2.5232	(0.0837)
Trade policy shock → EPU Trade			6.8834**	(0.0014)

NOTE: Cells contain pairwise correlations and Granger causality tests performed with two lags of each instrument (*p<0.05, **p<0.01, ***p<0.001). The dependent variable is the **baseline trade policy shock** which is aggregated to the quarterly frequency when testing for orthogonality wrt. TFP, monetary policy and oil price shocks and is kept at the monthly frequency, otherwise. For detailed data sources see appendix A.

a - Following Caldara et al. (2020), residuals are obtained from an AR(1) model of the log-difference in total factor productivity (TFP) adjusted for utilization; see Fernald (2012).

b - Crude oil supply shocks are obtained from Hamilton (2003).

c - Terms of trade shocks are proxied by estimating an AR(1) model of the ratio of export and import prices and extracting the residuals.

d - From estimating a Taylor rule for the pre-sample period (1961q1-2006q4) and taking the difference between the actual and the predicted federal funds rate.

e - Using the standard Taylor rule and imposing equal weights on the output and inflation gap (0.5), predicted values for the interest rate are calculated. Shocks are measured by the difference between the realized and the predicted federal funds rate.

f - Unlike when testing for orthogonality wrt. oil price shocks, trade policy shocks are included at the monthly frequency when verifying their relationship to real oil prices.

Table 7: Endogeneity of the stock price ratio of exporting and domestically oriented firms

Instruments	**Correlation**	(p-value)	**Granger F-test**	(p-value)
Macroeconomic shocks				
TFP growth shocks[a]	-0.0755	(0.6022)	0.51656	(0.6002)
Oil price shock shocks[b]	0.2164	(0.1312)	1.4355	(0.2492)
Terms of trade shocks[c]	-0.1876*	(0.0210)	0.86042	(0.4251)
Monetary policy shocks I.[d]	-0.6290***	(0.0000)	1.4439	(0.2470)
Monetary policy shocks II.[e]	-0.0721	(0.6153)	9.9323***	(0.0003)
Current/past economic conditions				
Unemployment rate	0.6919***	(0.0000)	4.2079*	(0.0167)
Growth in industrial production	0.2607**	(0.0012)	0.14725	(0.8632)
Recession probability	-0.1542	(0.0579)	0.17705	(0.8379)
Economic Activity Index (Growth)	0.0493	(0.5476)	1.8169	(0.1662)
PMI Composite Index	0.3986***	(0.0000)	2.0425	(0.1334)
Chicago Fed Nat. Activity Index	0.1922*	(0.0177)	1.7277	(0.1813)
Expected future economic conditions				
Consumer confidence (Univ. of Michigan)	-0.4580***	(0.0000)	1.5459	(0.2166)
Business confidence (OECD)	0.3992***	(0.0000)	4.9417**	(0.0084)
Real oil price[f]	0.5663***	(0.0000)	2.4473	(0.0901)
S&P500 return	0.1893*	(0.0199)	0.38541	(0.6809)
Uncertainty				
Macroecon. uncertainty (Jurado et al.)	0.0029	(0.9720)	0.31015	(0.7338)
Financial uncertainty (Jurado et al.)	0.0445	(0.5889)	6.364**	(0.0023)
VIX[k]	-0.0050	(0.9513)	2.5996	(0.0778)
EPU (Baker et al.)	0.3896***	(0.0000)	2.9456	(0.0557)
EPU Trade → Stock ratio	-0.1755*	(0.0306)	0.25306	(0.7768)
Stock ratio → EPU Trade			0.02377	(0.9765)

NOTE: Cells contain pairwise correlations and Granger causality tests performed with two lags of each instrument (*p<0.05, **p<0.01, ***p<0.001). The dependent variable is the **stock price ratio of exporting and domestically oriented firms** which is aggregated to the quarterly frequency when testing for orthogonality wrt. TFP, monetary policy and oil price shocks and is kept at the monthly frequency, otherwise. For detailed data sources see appendix A.
a, *b*, *c*, *d*, *e*, *f* - See table 6 above.

G Plots of impulse responses

G.1 Trade liberalizing vs protectionist shocks

The following plots show the responses of a trade liberalizing shock (first column) and a protectionist shock (second column), estimated from equation (5). To facilitate the interpretation, we flip the sign of the coefficient obtained for a protectionist shock. The light-shaded area represents the 90% confidence interval and the dark-shaded area indicates the 68% confidence interval. The third column shows the t-statistics from a Wald test with null hypothesis that the response to a liberalizing and protectionist shock are equal. The dark-shaded area represents the 90% acceptance interval (±1.645).

Liberalizing shock **Protectionist shock** **t-statistics**

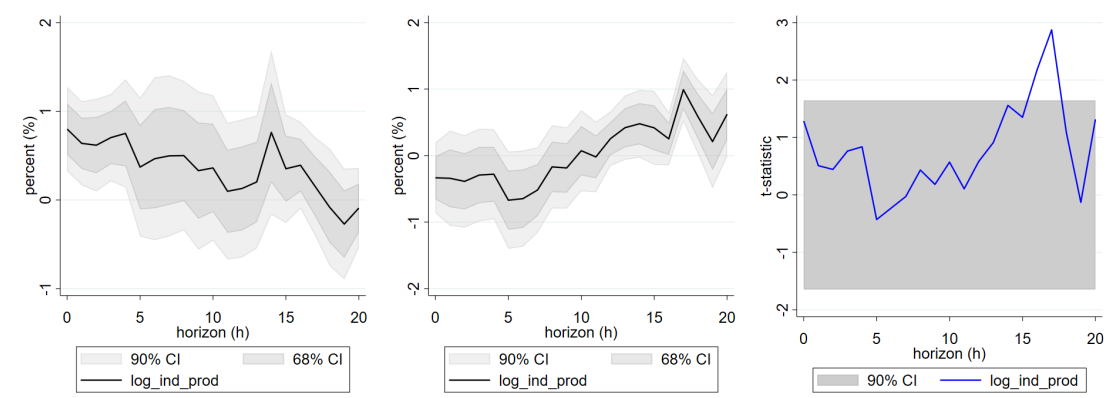


Figure 10: Industrial production (in logs)

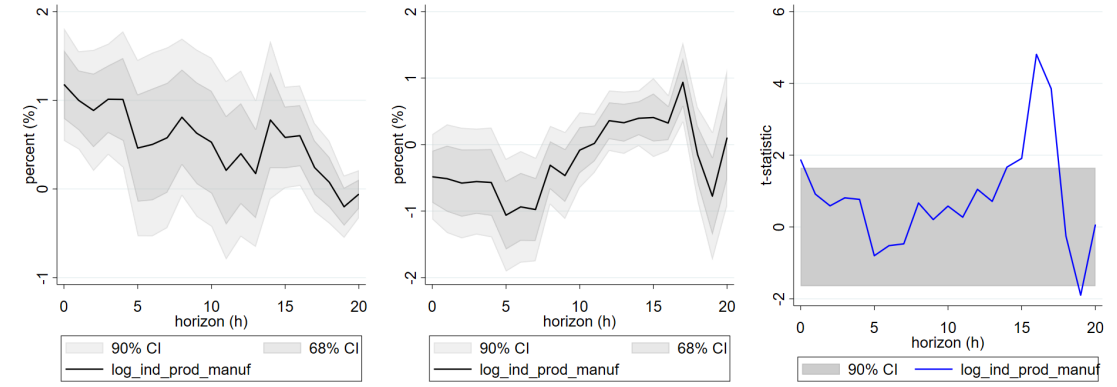


Figure 11: Industrial production: Manufacturing (in logs)

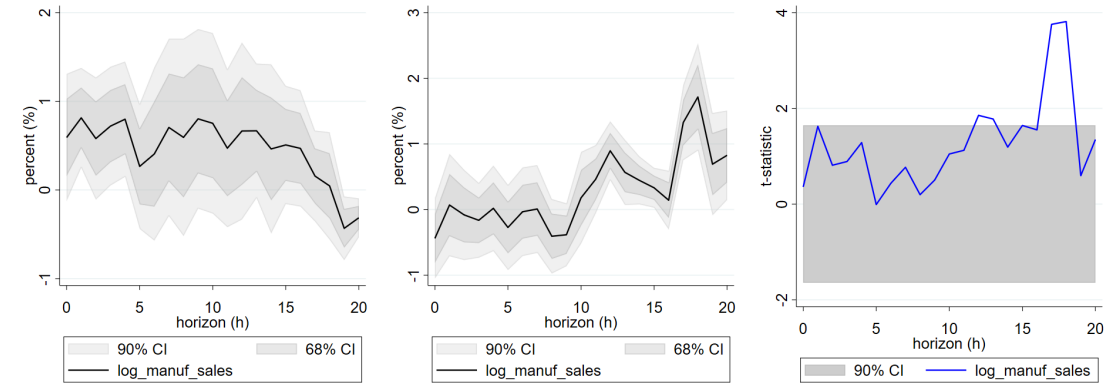


Figure 12: Manufacturing sales (in logs)

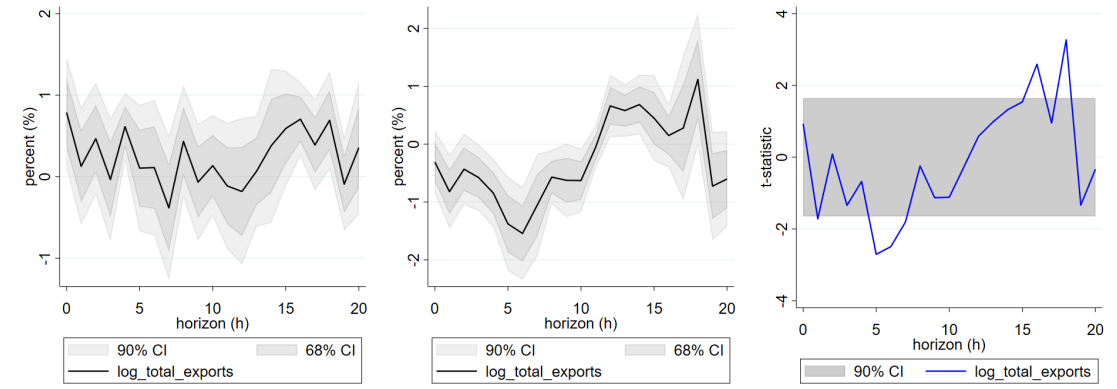


Figure 13: Exports (in logs)

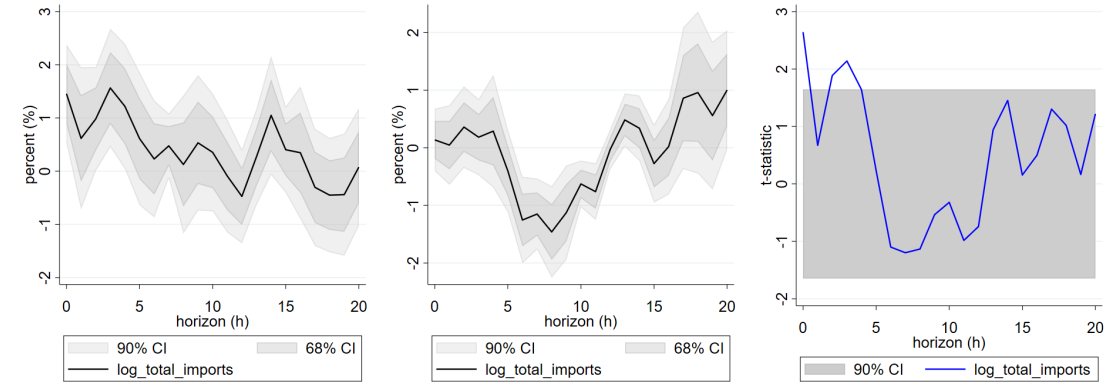


Figure 14: Imports (in logs)

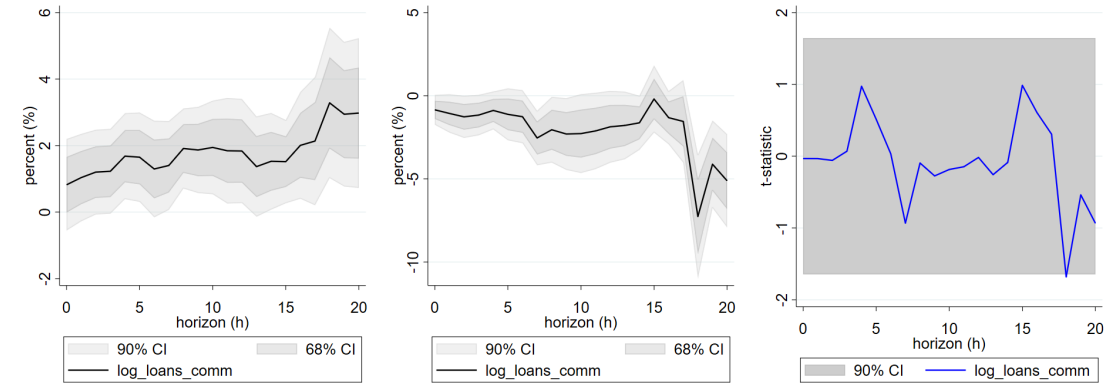


Figure 15: Commercial loans (in logs)

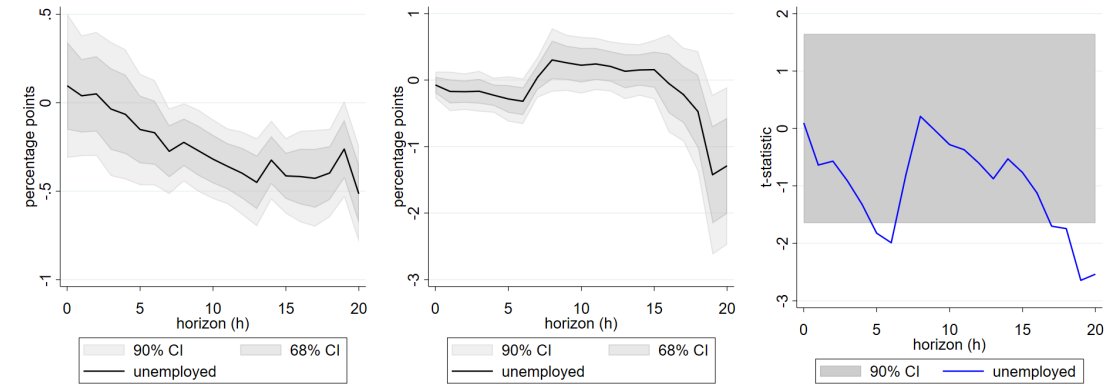


Figure 16: Unemployment rate

G.2 Implementation vs Announcement shocks

The following plots show the responses of a shock associated with an implementation of trade policy (first column) and a shock concerning announcements of trade policies (middle column), estimated from equation (5). The light and dark-shaded areas represent the 90% and 68% confidence intervals, respectively. The third column shows the t-statistics from testing the null hypothesis that the response to an implementation and an announcement shock are equal. The dark-shaded area represents the 90% acceptance interval (±1.645). If the blue line lies above the acceptance interval, there is evidence that the effect of a trade policy implementation is significantly more positive than an announcement - vice versa, if it falls below the interval.

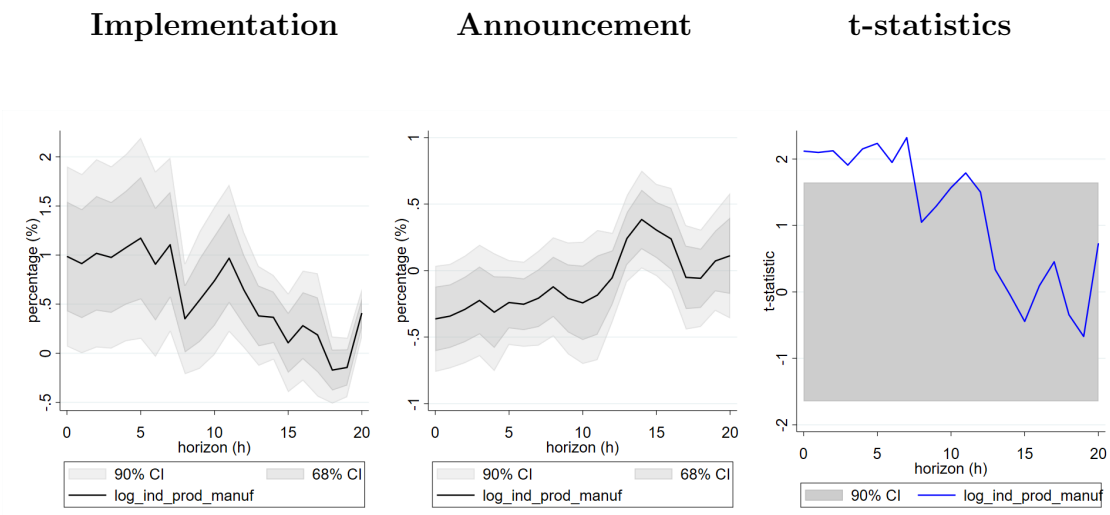


Figure 17: Industrial production: Manufacturing (in logs)

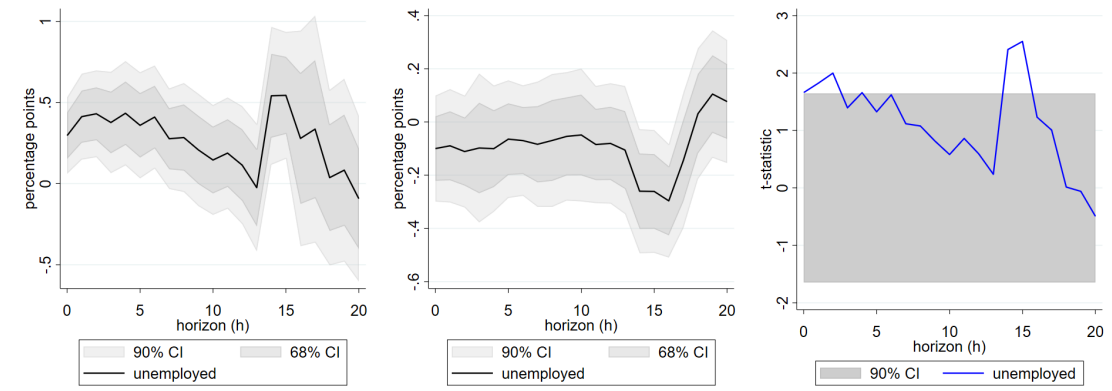


Figure 18: Unemployment rate

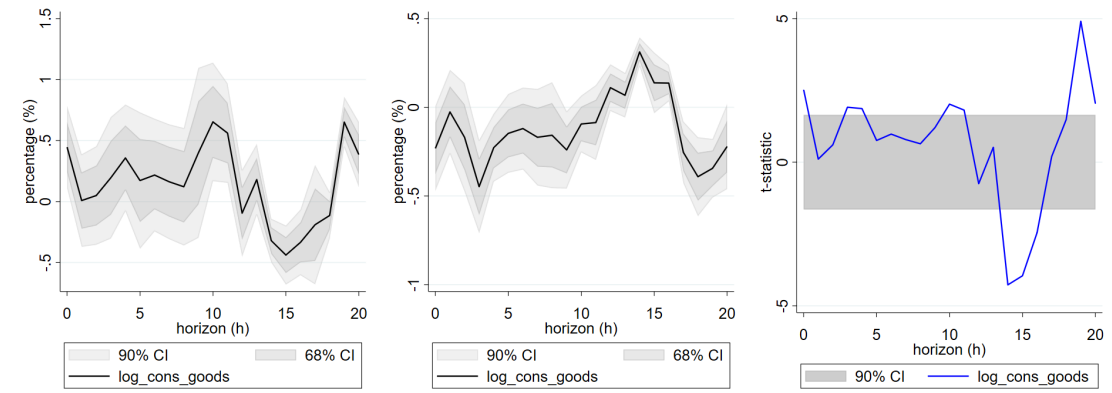


Figure 19: Consumption of goods (in logs)

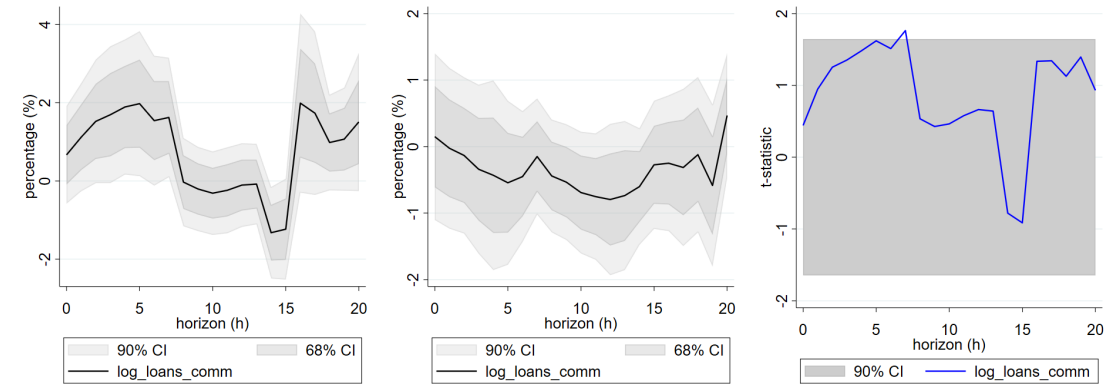


Figure 20: Commercial loans (in logs)

G.3 US vs Foreign shocks

The following plots show the responses of a shock originating from the US (first column) and a shock representing the response of a foreign trade partner (middle column), estimated from equation (5). The light and dark-shaded areas represent the 90% and 68% confidence intervals, respectively. The third column shows the t-statistics from the test with null hypothesis that the response to a US shock and a foreign shock are equal. The dark-shaded area represents the 90% acceptance interval (±1.645). If the blue line lies above the acceptance interval, there is evidence that the effect of a trade policy change initiated by the US is significantly more positive than of those made by a trade partner - vice versa, if the line falls below the interval.

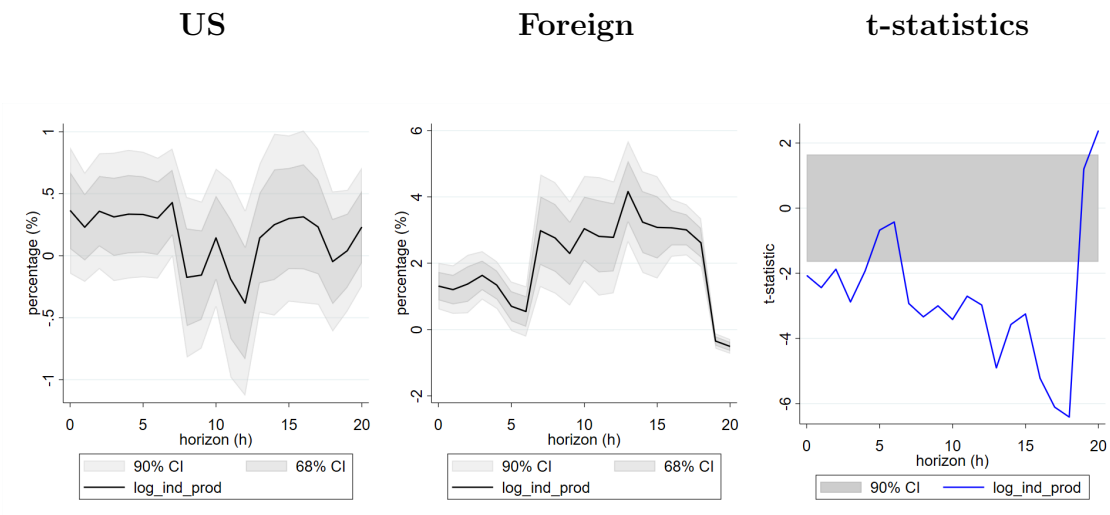


Figure 21: Industrial production (in logs)

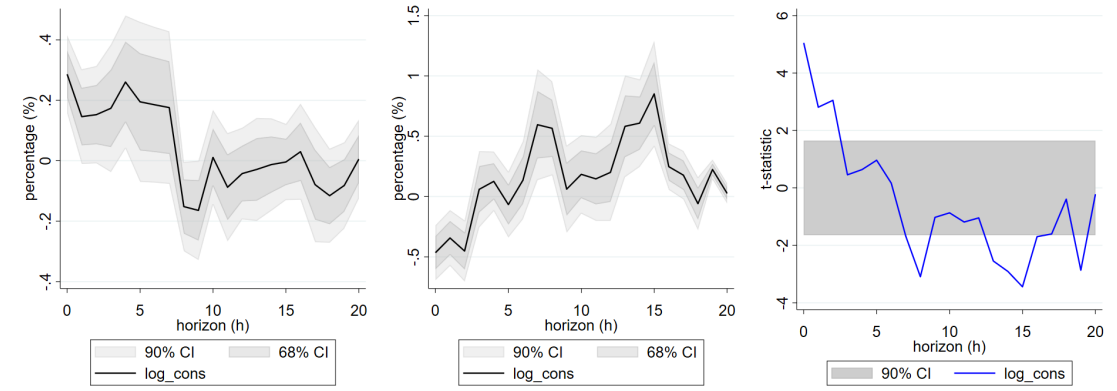


Figure 22: Consumption (in logs)

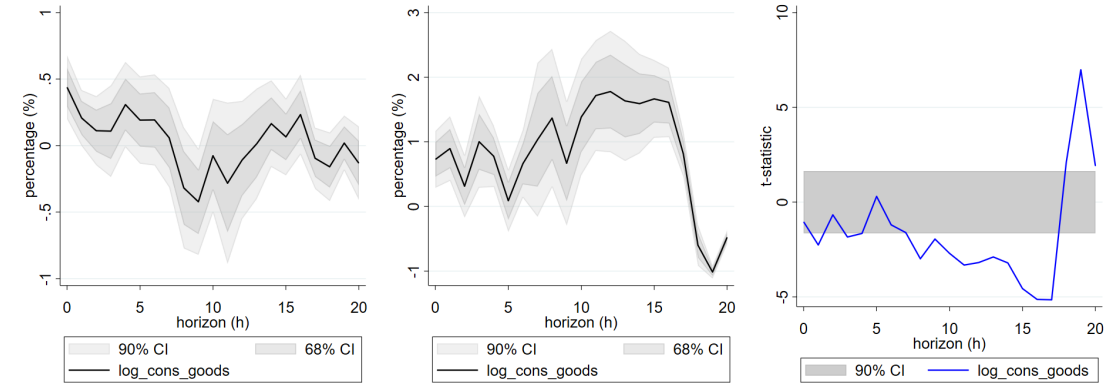


Figure 23: Consumption of goods (in logs)

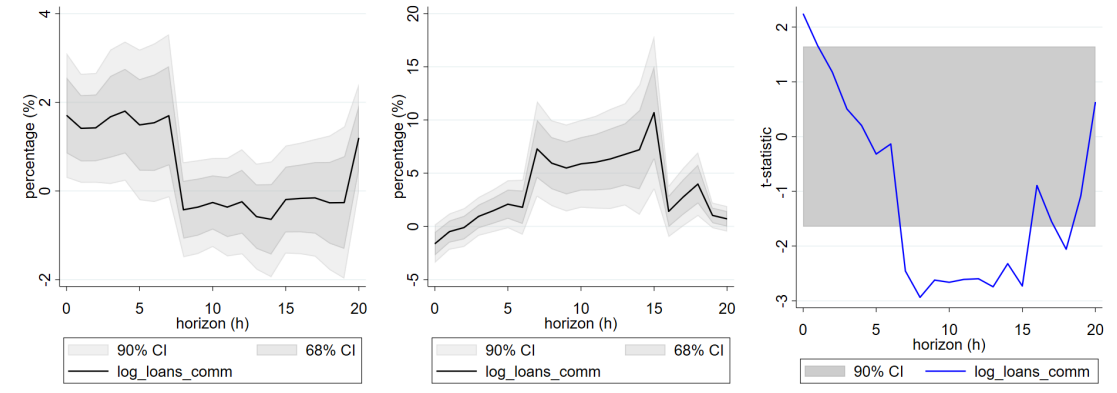


Figure 24: Commercial loans (in logs)

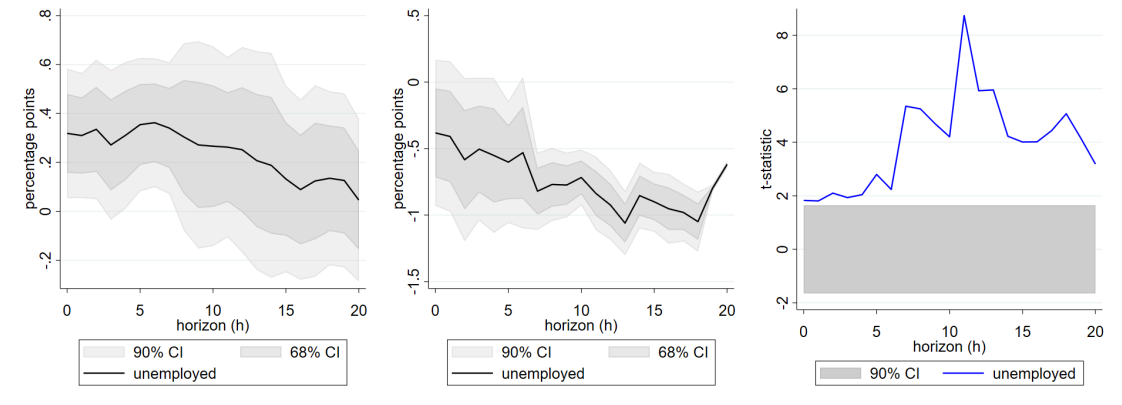


Figure 25: Unemployment rate

G.4 Non-linearities in shock size

Based of estimating equation (6), the following plots show the coefficient for the quadratic term for each horizon (first column) and the associated t-statistics together with the 90% acceptance interval (±1.645) (middle column). The third column shows the p-values at each horizon from a likelihood-ratio test of whether the linear-only nested model fares better than the model with the squared shock term. If the t-statistics (blue line, second column) falls outside the grey shaded area and the p-value (blue line, third column) stays within, we fail to accept the null hypothesis of no size dependence. Only plots of variables for which we find evidence of size dependence on impact are displayed.

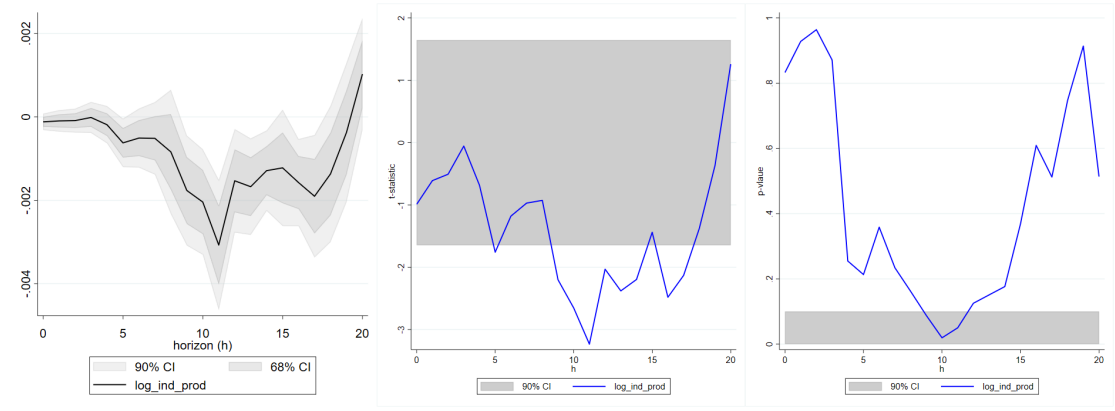


Figure 26: Industrial production (in logs)

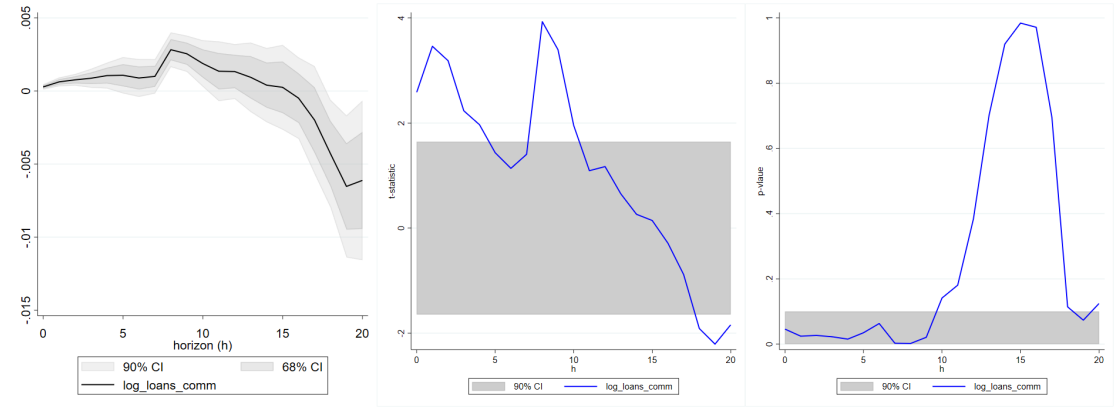


Figure 27: Commercial loans (in logs)

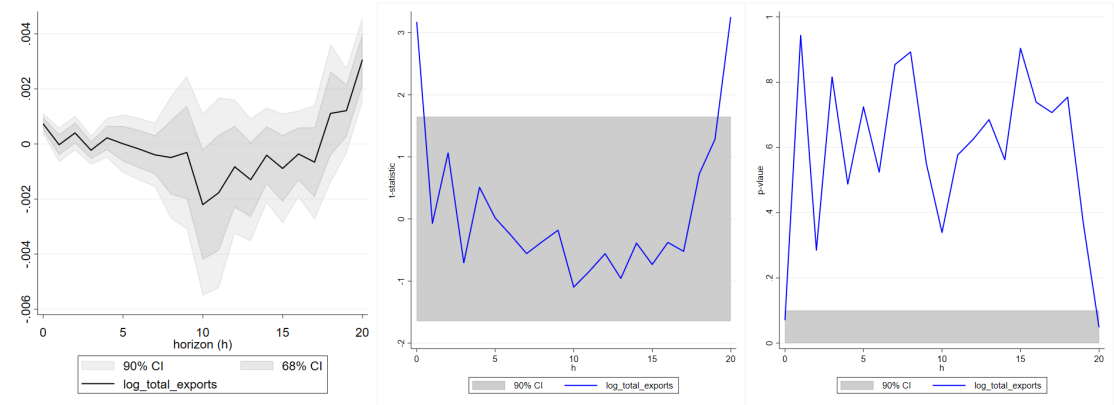


Figure 28: Exports (in logs)

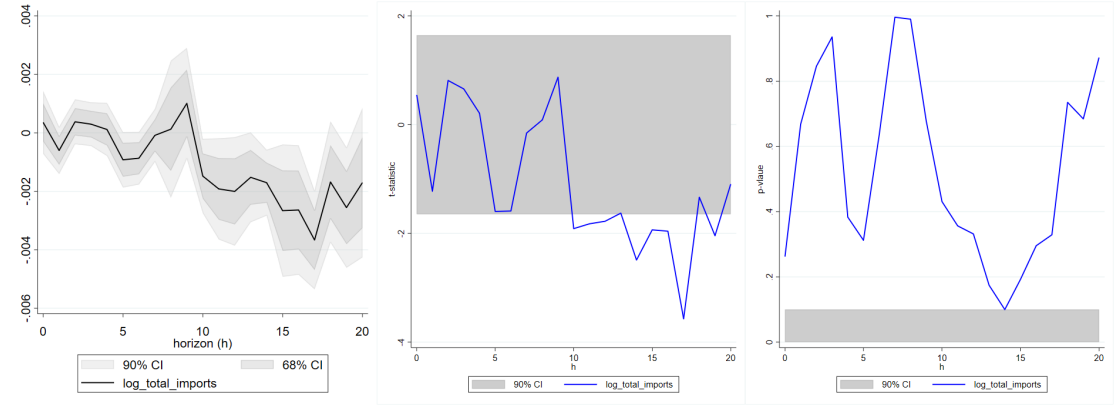
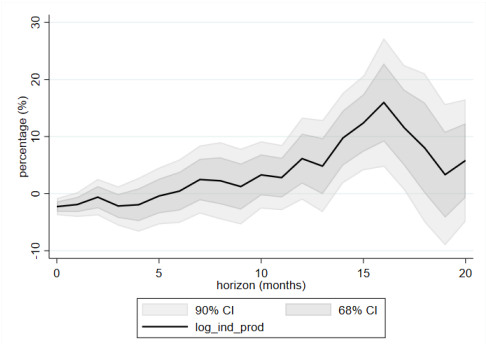


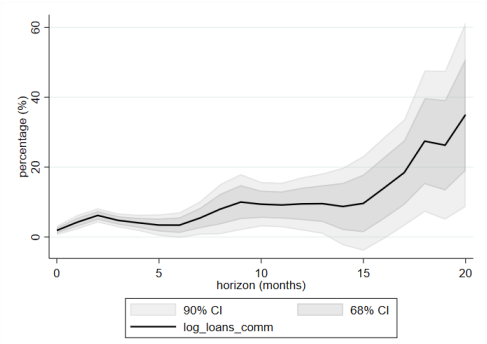
Figure 29: Imports (in logs)

H Plots from robustness checks

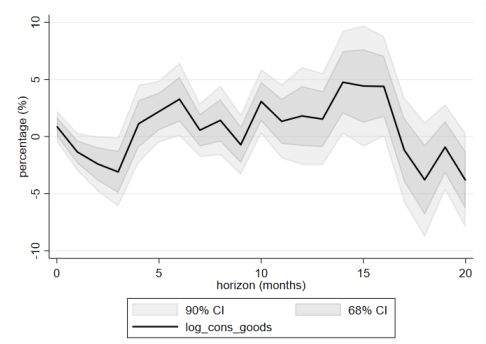
H.1 Different ways of constructing the baseline trade policy shock



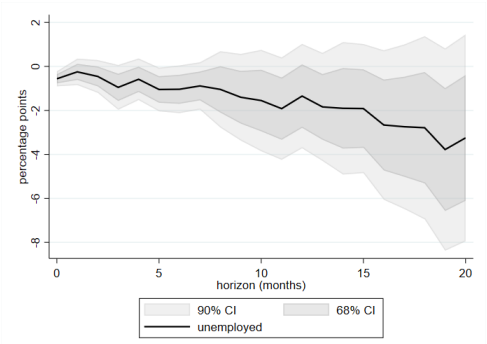
(a) Industrial production (in logs)



(b) Commercial loans (in logs)

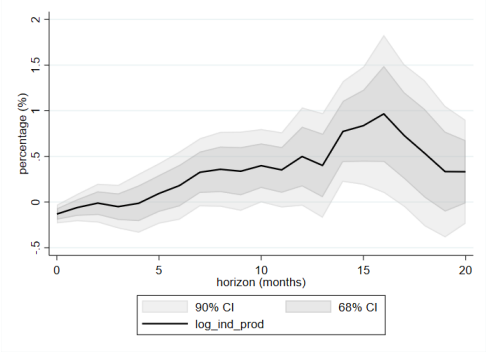


(c) Consumption of goods (in logs)

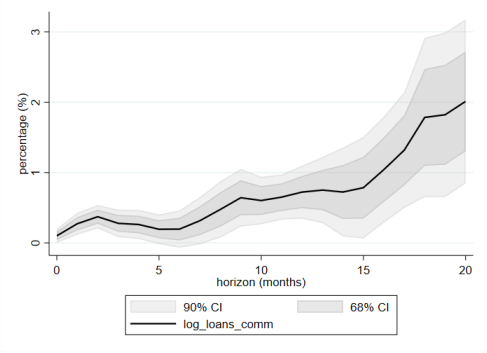


(d) Unemployment rate

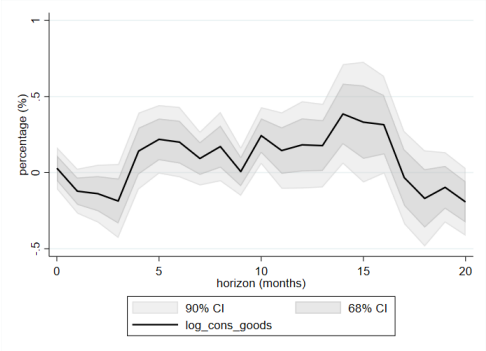
Figure 30: IRFs from trade policy shocks for which daily shocks are averaged over the month



(a) Industrial production (in logs)



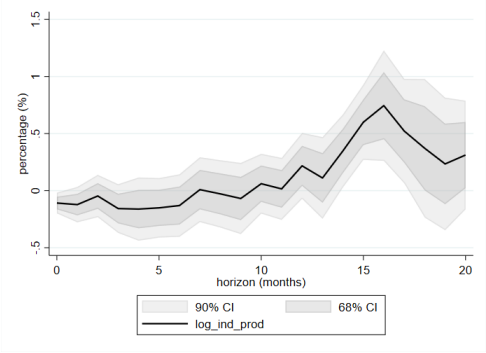
(b) Commercial loans (in logs)



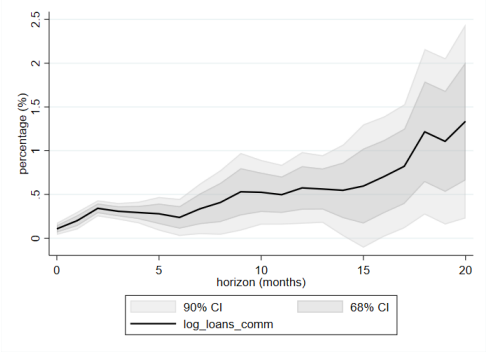
(c) Consumption of goods (in logs)

(d) Unemployment rate

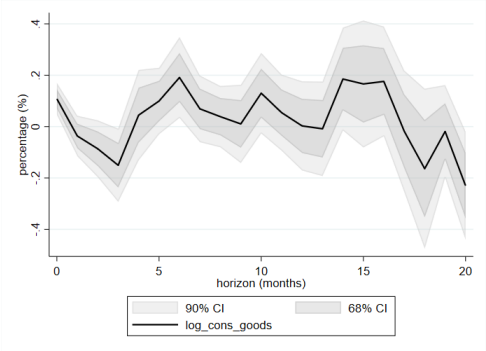
Figure 31: IRFs from trade policy shocks for which only the largest daily shock (in absolute terms) is chosen if there are several during the same month



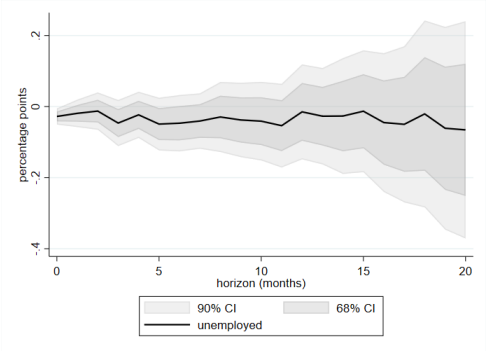
(a) Industrial production (in logs)



(b) Commercial loans (in logs)

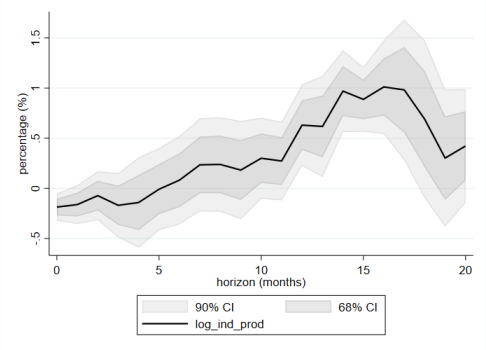


(c) Consumption of goods (in logs)

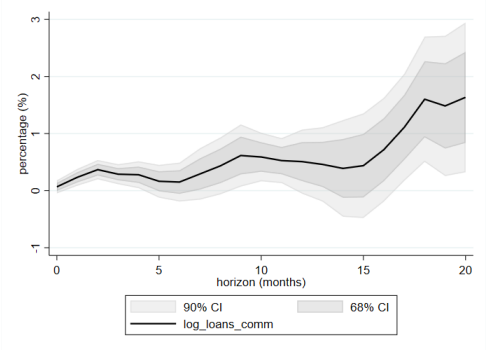


(d) Unemployment rate

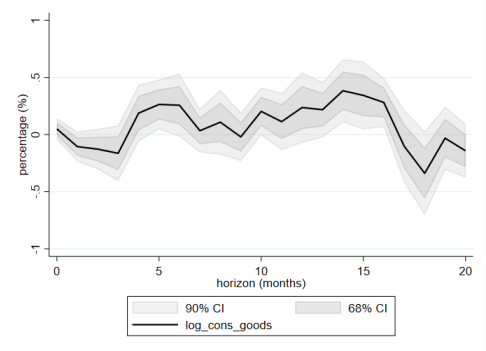
Figure 32: IRFs from only using "correctly" identified trade policy shocks based on ex-ante classification of statements into liberalizing and protectionist



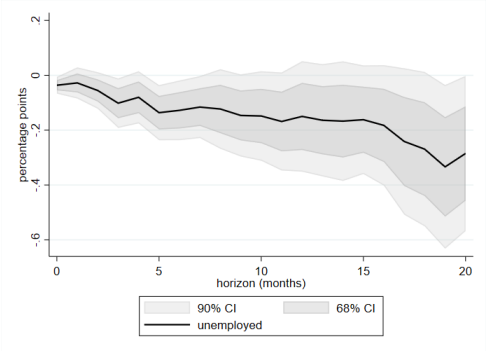
(a) Industrial production (in logs)



(b) Commercial loans (in logs)

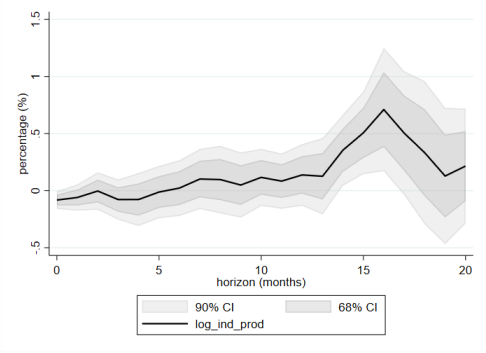


(c) Consumption of goods (in logs)

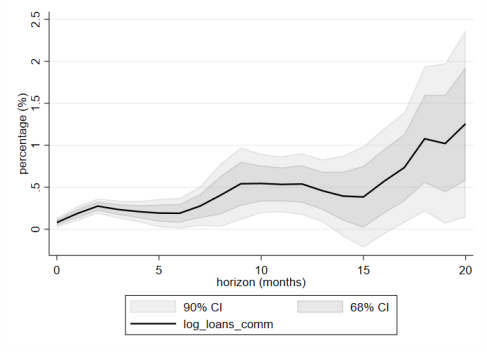


(d) Unemployment rate

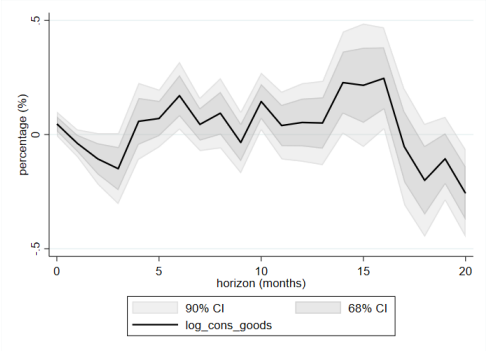
Figure 33: IRFs from building shock based on excess returns on the exporters' basket compared to the S&P500



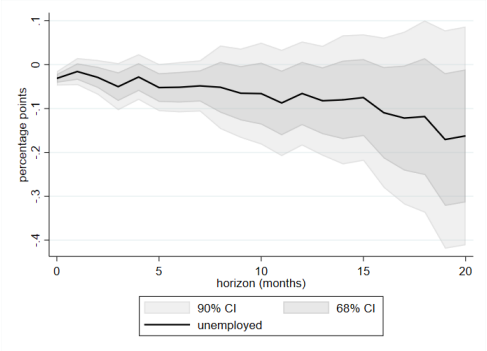
(a) Industrial production (in logs)



(b) Commercial loans (in logs)

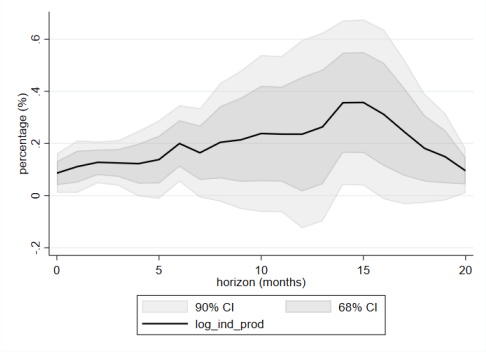


(c) Consumption of goods (in logs)

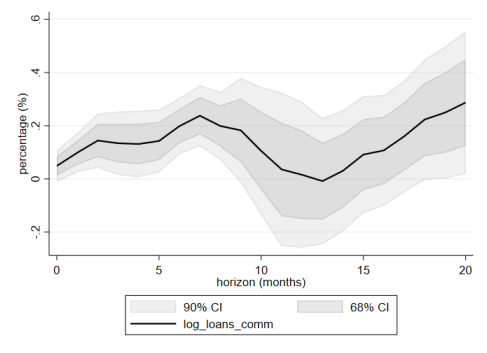


(d) Unemployment rate

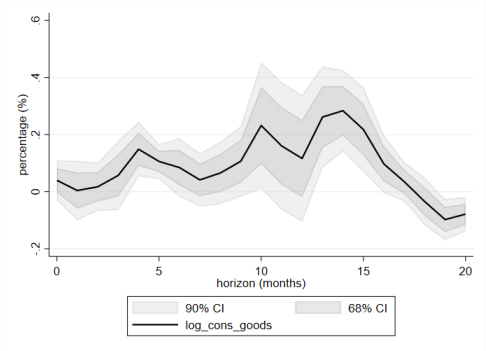
Figure 34: IRFs using the trade policy shock that is "cleaned" of other macroeconomic news



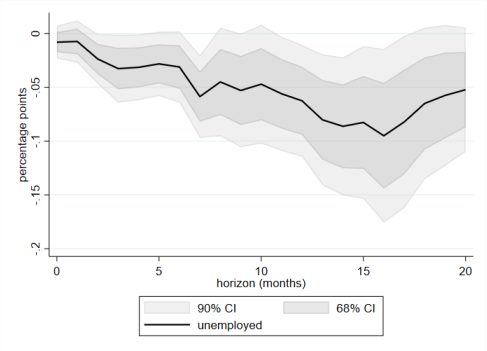
(a) Industrial production (in logs)



(b) Commercial loans (in logs)



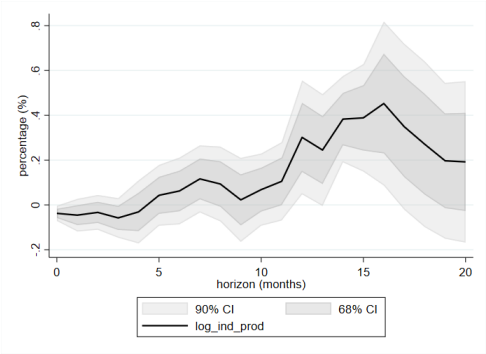
(c) Consumption of goods (in logs)



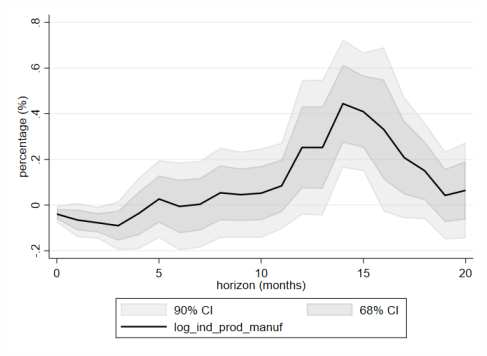
(d) Unemployment rate

Figure 35: IRFs using large movements in the ratio of exporters to non-exporters independently of whether a trade policy statement has been issued

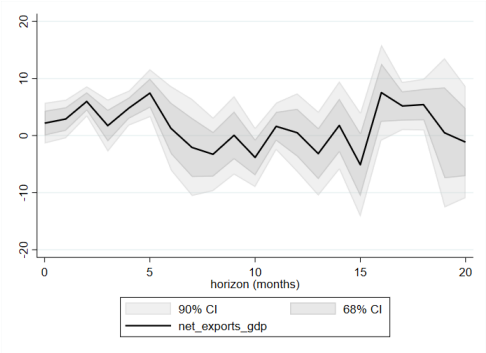
H.2 Building shocks based on importers' stock price index



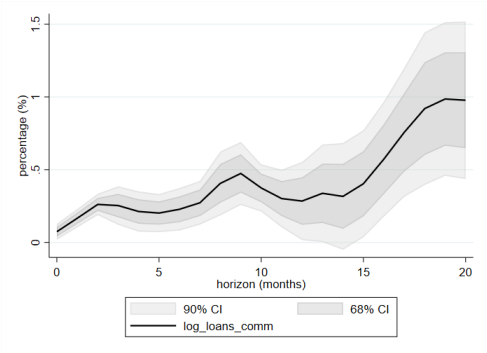
(a) Industrial production (in logs)



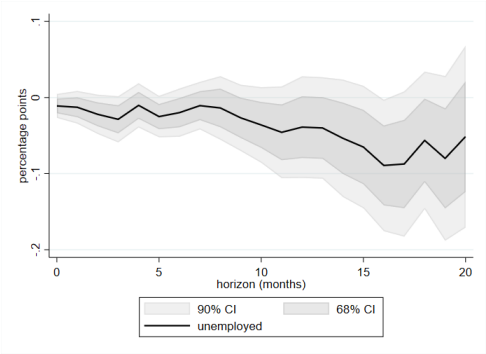
(b) Ind. prod.: Manufacturing (in logs)



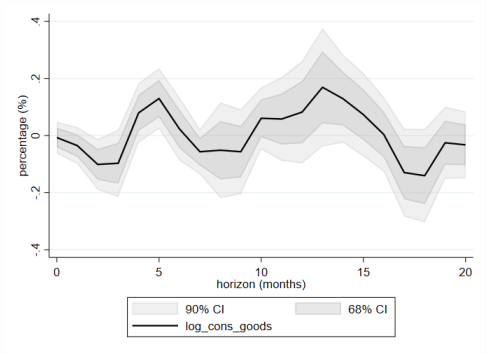
(c) Net exports to GDP



(d) Commercial loans (in logs)



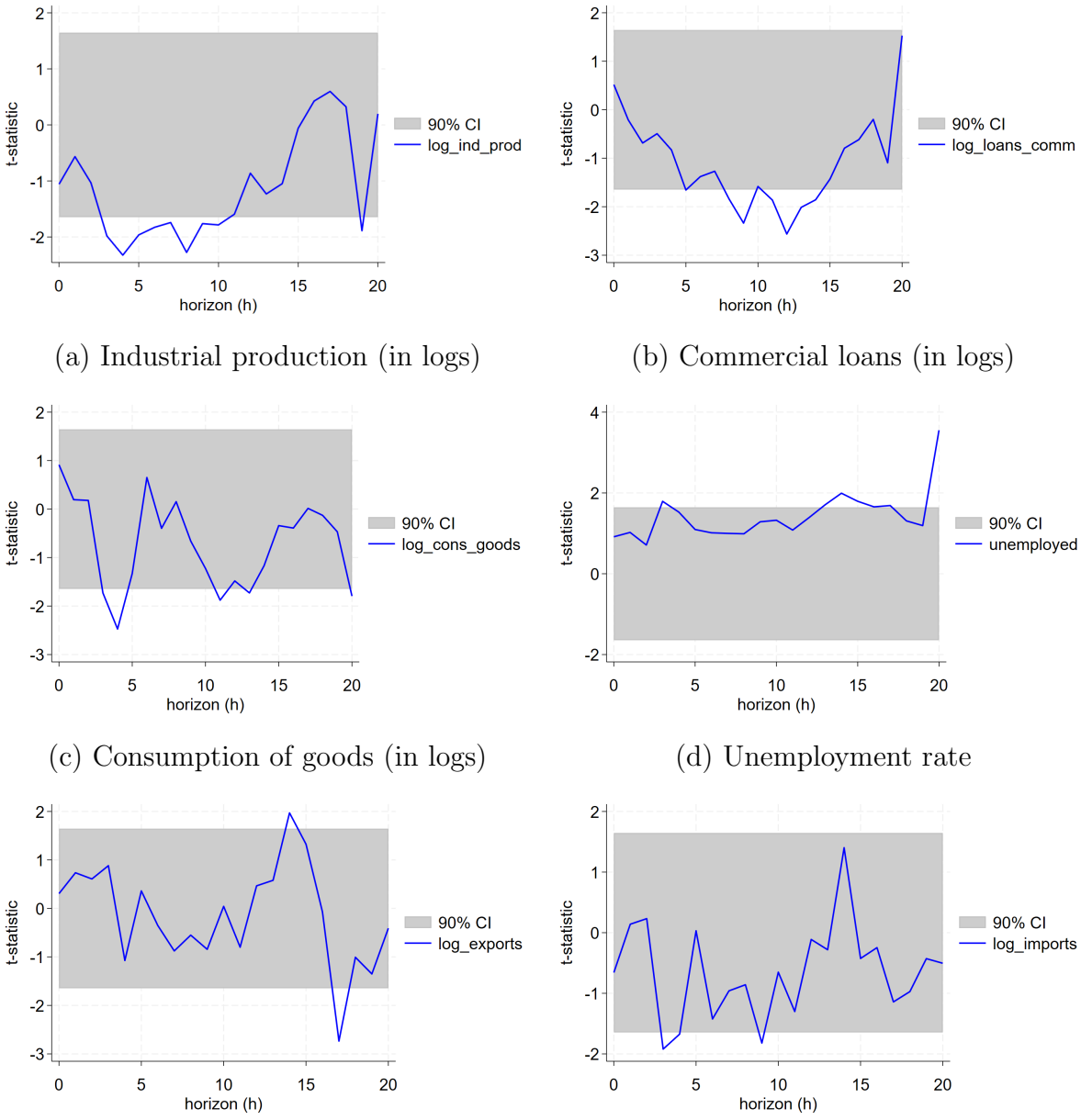
(e) Unemployment rate



(f) Consumption of goods (in logs)

Figure 36: IRFs from trade policy shocks based on importers' stock price index

H.3 Including interaction dummy capturing differential effects under different presidents



(a) Industrial production (in logs)

(b) Commercial loans (in logs)

(c) Consumption of goods (in logs)

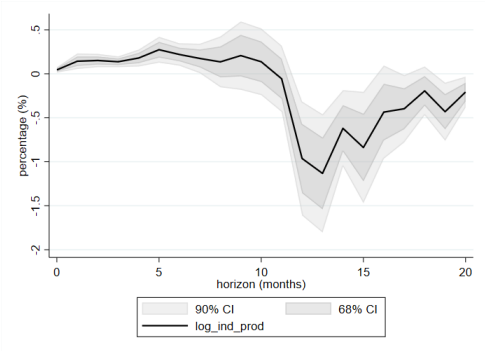
(d) Unemployment rate

(e) Exports (in logs)

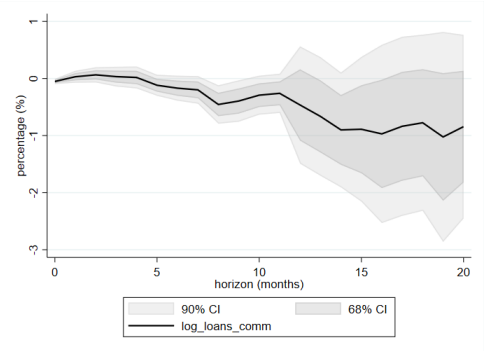
(f) Imports (in logs)

Figure 37: t-statistics from null hypothesis that the interaction term (between dummy for President Trump years in office and baseline trade policy shock) is not statistically significant.

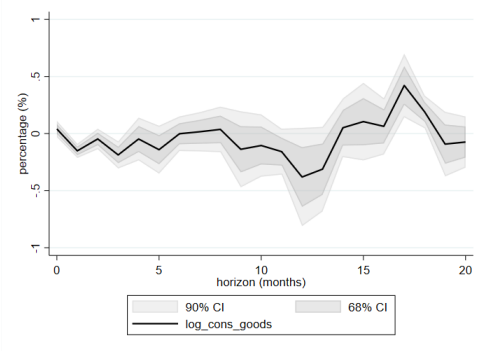
H.4 Using shocks based on President Trump's tweets on trade instead of official statements



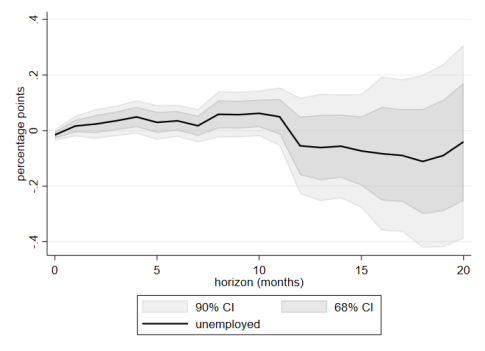
(a) Industrial production (in logs)



(b) Commercial loans (in logs)



(c) Consumption of goods (in logs)



(d) Unemployment rate

Figure 38: IRFs using shocks based on President Trump's tweets (agnostic approach regarding shock sign)

H.5 Stock market effects of official statements versus tweets

During Donald Trump's presidency, official trade policy communication channels have become complemented by messages released via the social media platform Twitter. Comparing t he content transmitted via both channels reveals the lack of specificity, simple language and larger noise component of tweets. The question that arises is whether stock returns reflect these differences.

We include official statements and trade-related tweets published by Donald

J. Trump simultaneously in equation (1). Since we pool protectionist and liberalizing statements and tweets in one regressor each, the coefficients displayed in table 8 should be interpreted as the impact of a liberalization, assuming that the effect across both types of policies is linear. Since some of the president's tweets simply mention and comment on foreign trade actions, we use all official statements, i.e., those issued by the US and its trade partners, for comparability. Unlike in the previous sections in which we use data from 2007 onward, the sample now starts in 2017 when President Trump took office.

Estimates of the effect of official policy statements are qualitatively in line with previous sections. Strikingly, once we control for official statements, tweets have no significant effect on any of the dependent stock market variables.

Overall, there is some evidence that investors continue to respond to news obtained from government agencies despite the rise of novel communication channels. Exporters' unresponsive stock returns reflect that tweets do not provide additional information.

Table 8: The stock market effect of official statements and tweets

	(1) $\Delta \frac{P_{\text{exporter}}}{P_{\text{non-exporter}}}$	(2) $\Delta P_{\text{exporter}}$	(3) $\Delta P_{\text{non-exporter}}$	(4) $\Delta \frac{P_{\text{importer}}}{P_{\text{non-importer}}}$
TP_t^{all} (Official)	0.295***	0.185**	-0.111*	0.232
	(4.05)	(3.28)	(-2.39)	(1.96)
$Tweet_t^{all}$	0.0780	0.0809	-0.00152	0.158
	(1.06)	(1.29)	(-0.03)	(1.93)
Constant	-0.206	0.672	0.786	2.948
	(-0.11)	(0.56)	(0.81)	(1.58)
Observations	729	729	729	599
Controls	Yes	Yes	Yes	Yes

t statistics in parentheses.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Notes: See table 1. Independent variables: Trade policy and tweet variable indicating, respectively, whether an official statement (TP_t^{all}) or a trade-related tweet by D. Trump ($Tweet_t^{all}$) was issued. The two variables take the value of 1 if a liberalizing policy change was suggested via the respective communication channel, -1 if the tone was protectionist and 0 otherwise.

Acknowledgements

We thank Evi Pappa, Leonardo Melosi, Sule Alan, Stefania D'Amico, Russell Cooper and Ramon Marimon for their insightful comments and invaluable advice. We are also grateful to participants in various seminars at the EUI, the ECB, the Chicago Fed, Norges Bank, the 2022 AMEF Conference, the ITFA 32nd Annual Conference and the 2022 IAAE Conference for comments and suggestions that helped to improve this work.
The views expressed herein are those of the authors and do not necessarily reflect the views of the SNB or the ECB.

Alica Ida Bonk
Swiss National Bank, Zurich, Switzerland; email: alicaida.bonk@snb.ch

Chloe Larkou
European Central Bank, Frankfurt am Main, Germany; email: chloe.larkou@ecb.europa.eu

© European Central Bank, 2025

Postal address 60640 Frankfurt am Main, Germany
Telephone +49 69 1344 0
Website www.ecb.europa.eu

All rights reserved. Any reproduction, publication and reprint in the form of a different publication, whether printed or produced electronically, in whole or in part, is permitted only with the explicit written authorisation of the ECB or the authors.

This paper can be downloaded without charge from www.ecb.europa.eu, from the Social Science Research Network electronic library or from RePEc: Research Papers in Economics. Information on all of the papers published in the ECB Working Paper Series can be found on the ECB's website.

PDF ISBN 978-92-899-7405-9 ISSN 1725-2806 doi:10.2866/3942380 QB-01-25-178-EN-N