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## Uncertainty about trade policy uncertainty

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Federal Reserve Bank of New York  
Staff Reports

# Uncertainty about Trade Policy Uncertainty

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Jan J. J. Groen

Staff Report No. 919  
March 2020



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JEL classification: C11, C22, E53

### **Abstract**

We revisit in this note the macroeconomic impact of the recent rise in trade policy uncertainty. As in the literature, we do find that high trade policy uncertainty can adversely impact domestic and foreign economic activity. In addition, we identify an alternative business sentiment channel that is separate and distinct from the impact of trade policy uncertainty, which provides a complementary explanation of the recent developments in the U.S. and global economic activities. This sentiment channel also implies that subsiding trade policy uncertainty does not necessarily result in a recovery of the manufacturing sector and investment spending as long as business sentiment remains negative.

Key words: uncertainty, trade policy, business sentiment

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To view the authors' disclosure statements, visit [https://www.newyorkfed.org/research/staff\\_reports/sr919.html](https://www.newyorkfed.org/research/staff_reports/sr919.html).

# 1 Introduction

Considerations about trade uncertainty have dominated the policy debates and the narrative around recent developments in the economic outlook. As noted by Caldara et al. (2019b), concerns about the trade policy outcomes have appeared in the Beige Book, that collects anecdotal information about economic activity in the US economy. Moreover, several speeches by Fed officials have emphasized the role of trade disputes behind the recent slowdown in economic activity.

The narrative is based on the idea that an increase in trade policy uncertainty leads to a decrease in business investment and a contraction in industrial production. Indeed, trade uncertainty is cited as one key factor for explaining the slowdown in the manufacturing sector in the US economy.

In this note, we propose an alternative explanation for understanding the recent slowdown and compare its implication with the narrative based on trade uncertainty. One of the reasons for which an explanation based on trade uncertainty is not fully satisfying is that once we interpret trade uncertainty as a general uncertainty shock (as in Caldara et al. (2019b)) the transmission mechanism of such a shock would require a decline in consumption which is not consistent with the current evidence. We note indeed, that the key feature of the current slowdown in economic activity has been the marked decrease in business investment, while consumption has not shown any significant correction.

We then argue that to understand this pattern we need to rely on factors that are specific to the business sector and we conjecture that the deterioration of business sentiment could be a key driver of the decline in business investment. Our argument is similar in spirit to the interpretation by Blanchard (1993) who suggests that one possible explanation of the decline in consumption and the recession of 1990-1991 is to be looked into consumers' animal spirits. In a parallel fashion, we suggest that the decline in manufacturing activity has been driven by business investments' animal spirits.

To support our analysis we first rely on business sentiment by using the business confidence indicator by the OECD that provides information on future developments, based upon opinion surveys on developments in production, orders and stocks of finished goods in the industry sector. This index can be used to monitor output growth and to anticipate turning points in economic activity. Numbers above 100 suggest an increased confidence in near future business performance, and numbers below 100 indicate pessimism towards future performance of the economy.

We conduct our empirical analysis on the role of business sentiment and trade uncertainty by adopting a VAR specification which is largely based on Caldara et al. (2019a). Our main results are as follows:

- When we augment the VAR that contains the trade uncertainty measure as used by Caldara et al. (2019a) with a measure of U.S. business sentiment, we find that *the decline in business sentiment is independent from the increase in trade uncertainty.*
- We find also that *the decline in business sentiment (ISM) is consistent with a reduction in both U.S. and foreign industrial production, as well as an increase in credit spreads.*
- When we augment the baseline VAR with real PCE consumption and business investment we find that *a decline in business sentiment leads to lower business investment with no material impact on consumption* consistently with the recent evidence.
- For the near-term outlook, our analysis suggests that subsiding trade tensions might not result in a rebound in manufacturing output and investment spending, as long as business sentiment does not recover.

## 2 Quantifying the Impact of Business Sentiment and Trade Uncertainty Shocks

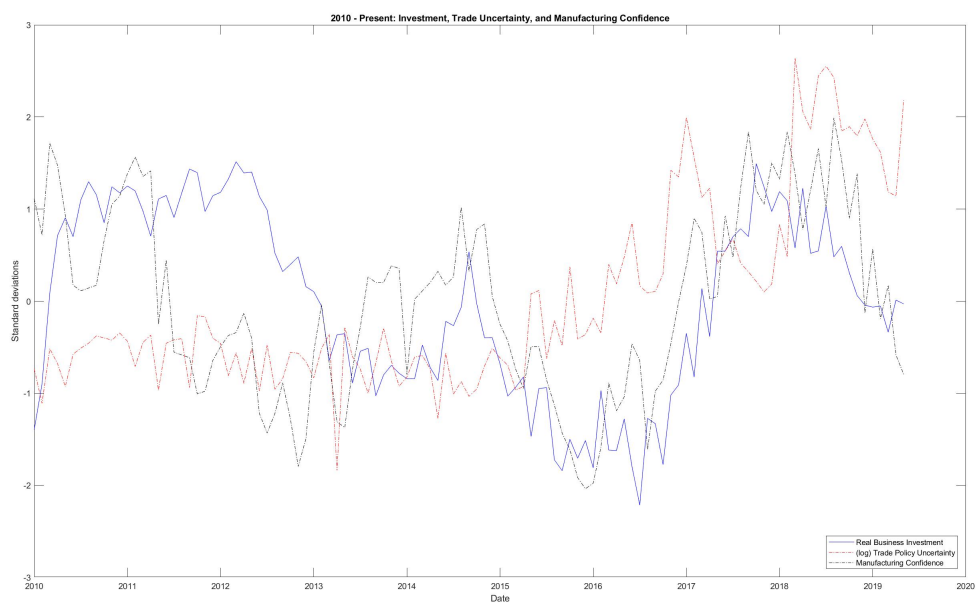
### 2.1 The VAR Approach

As shown in Figure 1, the decline in business sentiment started in the early 2018 with TPU increasing sharply in that same year and this has gone hand in hand with a slowdown in business investment. To quantify the effects of TPU and business sentiment on economic activity, we estimate a monthly vector auto-regressive (VAR) model consisting of  $k$  monthly financial, macro and sentiment series:

$$\underbrace{Y_t}_{k \times 1} = \underbrace{D_0}_{k \times 1} + \sum_{i=1}^p \underbrace{D_i}_{k \times 1} \underbrace{Y_{t-i}}_{k \times 1} + \underbrace{\varepsilon_t}_{k \times 1}; \quad \varepsilon_t \sim iid(\mathbf{0}, \Omega^\varepsilon). \quad (1)$$

Our analysis parallels the one by Caldara et al. (2019a) who use a VAR model like (1), where the vector  $Y_t$  contains monthly data over the 1985-2019 sample consisting of manufacturing production for the United States (USIPMFG), industrial production in advanced foreign economies (AFEIP), industrial production in Emerging Market Economies (EMEIP), world imports (WORLDIMPBCAST), U.S. import tariffs as a proportion of U.S. goods imports (TARIFFSMA), the Caldara et al. (2019b) news-based measure of trade policy uncertainty (BoardTPU), U.S. stock prices as measured by the S&P 500 (SP500), the broad real dollar index (FXTWBDIC), and the Gilchrist and Zakrajsek (2012) U.S. corporate bond risk premium (EBP). As in Caldara et al. (2019a), the inclusion of tariffs in the VAR model allows us to isolate movements in TPU that reflect genuine trade

Figure 1: TPU, business sentiment and business investment since 2010



**Notes:** The figure plots the log level of the Caldara et al. (2019b) news-based TPU, the OECD business sentiment index for the U.S. and year-over-year growth in a monthly business investment spending proxy (nondefense capital goods shipments excluding aircraft deflated by the private capital equipment PPI). The series are standardized over the sample and thus measures the deviation from the historical average in standard deviation terms.

uncertainty from those that reflect implemented trade policy actions.<sup>12</sup>

Following Caldara et al. (2019a) a VAR model (1) with  $p = 3$  lags is estimated for the period January 1985 - May 2019 with a Bayesian Monte Carlo Markov Chain (MCMC) simulation estimator based on a Minnesota prior on the  $D_1 \cdots D_p$  parameter matrices, where following a burn-in period of 1000 draws the procedure uses 10000 MCMC draws to estimate the distribution of the VAR parameters.<sup>3</sup> A structural shock to TPU is then identified by recursive ordering of the described variables, where the financial variables are allowed to react contemporaneously to a TPU shock whereas all other variables will react with at least a one month lag.

In the next subsection we present the results of our VAR analysis first by replicating the Caldara et al. (2019a) result and then entertain a number of extensions of the aforementioned VAR set up to support our conjecture.

## 2.2 Results

Figure 2 replicates the Caldara et al. (2019a) result of the adverse impact of a TPU shock on economic activity in the U.S. and abroad, where the impact on U.S. and foreign industrial production is persistently negative.

While this pattern is consistent with the observed evidence we argue that once we interpret the TPU shock as a general uncertainty shock (as Caldara et al. (2019b) do in their general equilibrium model by using a mark-up shock as a proxy for the TPU shock) we should also observe a decline in consumption. Following an increase in TPU, U.S. consumption should also be adversely affected as a more uncertain outlook would induce households to ramp up their precautionary savings. To check the consistency between the theoretical transmission mechanism and the empirical evidence, we therefore expand the aforementioned VAR model by adding real personal consumption expenditures (PCE) for the U.S.; Figure 3 reports the dynamics following a TPU shock in the extended VAR model. Overall, the results are robust to the new augmented VAR and the impact on real PCE seems negative but not significant consistent with the structural theoretical interpretation.

As a large proportion goods imports in the U.S. relates to capital goods imports, one can instead potential interpret a TPU shock as raising the uncertainty for firms' investment plans, which would dampen business investment spending. To explore this

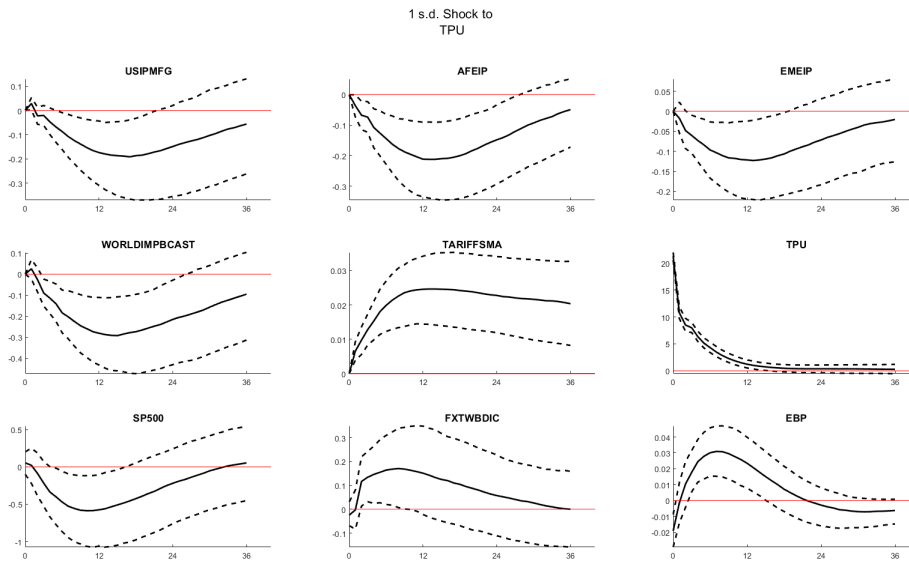
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<sup>1</sup>These are the same series as used in Caldara et al. (2019a) and we refer to their note for the data sources.

<sup>2</sup>The VAR model utilizes the following data transformations: with the exception of TPU and EBP all other variables are linearly detrended log levels, whereas we take the log level of TPU and the raw level of EBP (as the bond risk premium is in percent).

<sup>3</sup>The Minnesota prior uses the equivalent of 1 standard deviation to shrink the parameters of a variable in the VAR and 2 standard deviations to shrink distant lags of variables.

Figure 2: The effect of a TPU shock in the original Caldara et al. (2019a) VAR



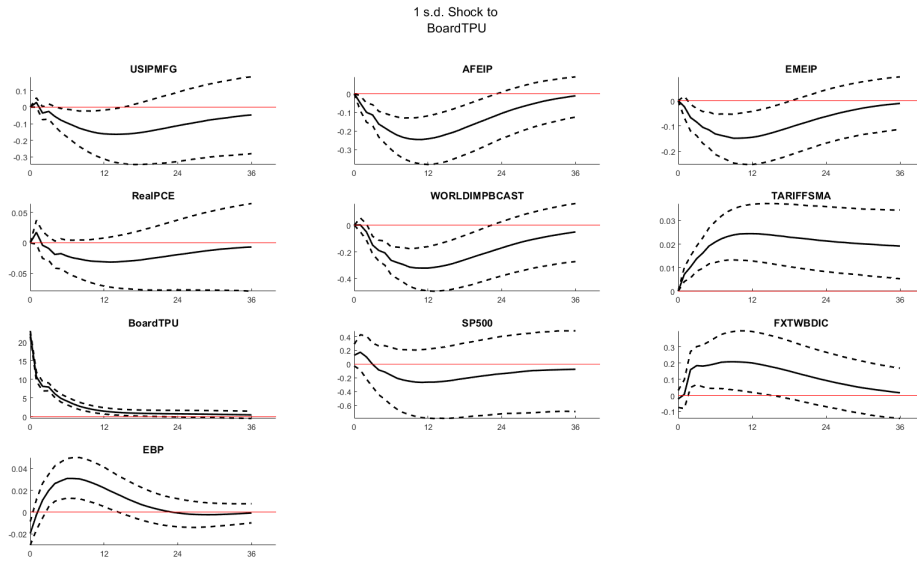
**Notes:** The figure reports responses of the variables conditional on a 1 standard deviation shock to log TPU, where the ordering of the variables coincides with the recursive ordering used to identify the shock. The bands are 68% confidence intervals based on 10000 MCMC draws.

potential channel of TPU effects we not only add real PCE to the original VAR set up, but also a monthly proxy for business investment spending. This monthly business investment spending proxy equals nominal shipments of nondefense capital goods excluding aircraft as published by the U.S. Census, which is source data for the NIPA measure of business equipment spending, deflated by the PPI deflator for private capital equipment. Figure 4 reports on the impulse responses of a TPU shock in such a further expanded VAR model. Relative to Figure 3 the impact on real PCE remains unchanged. The response of business investment spending, however, is positive after a TPU shock, as the U.S. corporate bond risk premium drops following a TPU shock, an effect that also occurred in the original Caldara et al. (2019a) set up as shown in Figure 2.

We then proceed by analyze the role of business sentiment as discussed above. We first examine the extent to which business sentiment is distinct from TPU. Indeed, it could still be the case that a TPU shock mimics a negative shock to business sentiment reflecting increased uncertainty for firms when planning their business fixed investment decisions. To explore this we expand the Caldara et al. (2019a) VAR model with both real PCE, the monthly proxy for business spending on equipment and the OECD measure for U.S. business sentiment. In the recursive ordering of the variables in the VAR model business



Figure 3: The effect of a TPU shock in the VAR expanded with real PCE



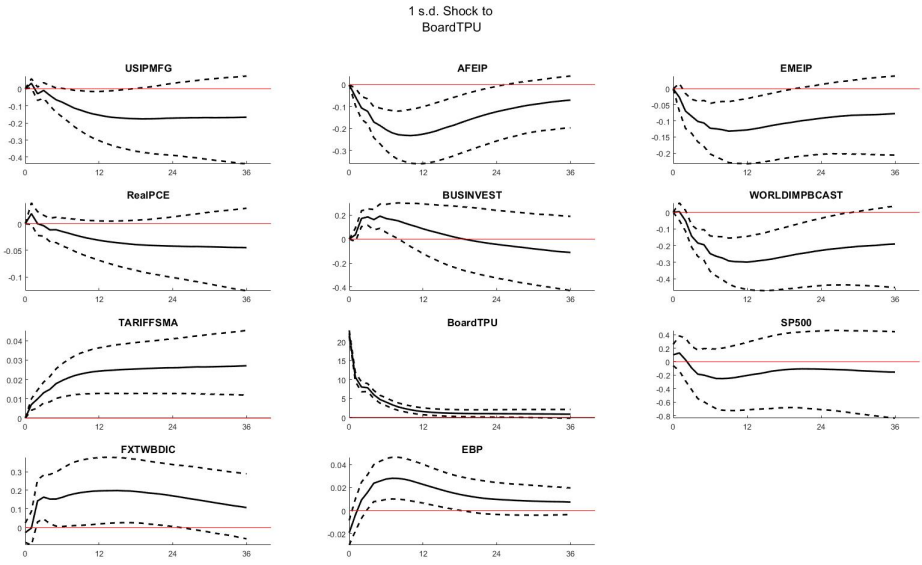
**Notes:** The figure reports responses of the variables conditional on a 1 standard deviation shock to log TPU, where the ordering of the variables coincides with the recursive ordering used to identify the shock. The bands are 68% confidence intervals based on 10000 MCMC draws.

sentiment is grouped with the financial variable so it can react contemporaneously to TPU but not *vice versa*, and based on this ordering we identify the responses to TPU shocks and negative business sentiment shocks.

It turns out that shocks to TPU and business sentiment are two distinct events, each implying different responses across the variables included in the VAR model. A TPU shock still adversely affects production abroad, as can be seen from Figure 5, but now does not impact significantly U.S. production as business investment increases. A negative business sentiment shock, in contrast, will cause declines in U.S. and foreign production as well as U.S. business investment, as U.S. financial conditions deteriorate on impact, while consumption remains unaffected, a pattern that seem consistent with the observed evidence. In the Appendix we reverse the ordering between TPU and business sentiment and the dynamics is not impacted in a meaningful way, suggesting that the above described effects of shocks to TPU and U.S. business sentiment are independent and distinct.

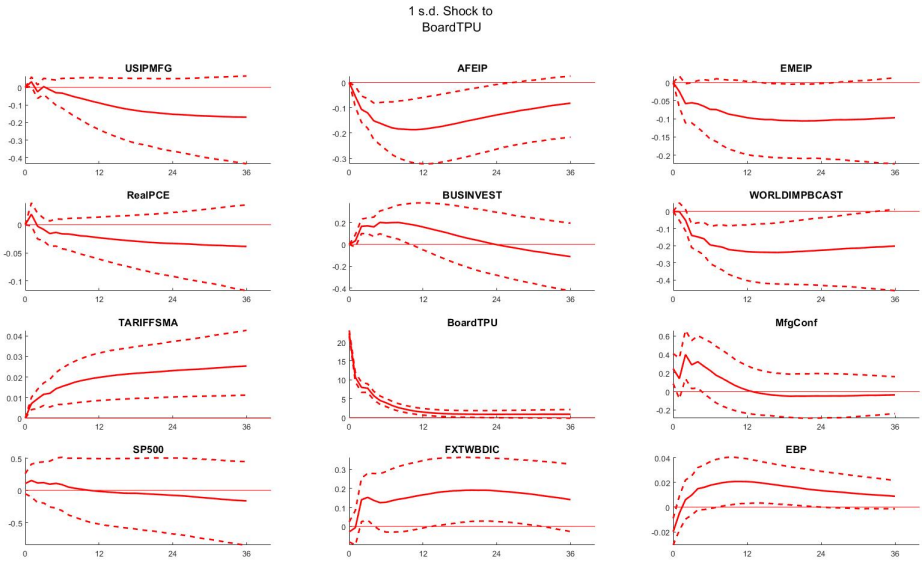
Overall our analysis suggest that, although TPU no doubt ramped up from 2018 onwards as the current U.S. administration announced a sequence of import tariff increases, the pattern in U.S. and foreign economic activity and U.S. financial conditions over this period seems more in line with the effects of a deterioration of U.S. business sentiment

Figure 4: The effect of a TPU shock in the VAR expanded with real PCE and monthly business investment spending



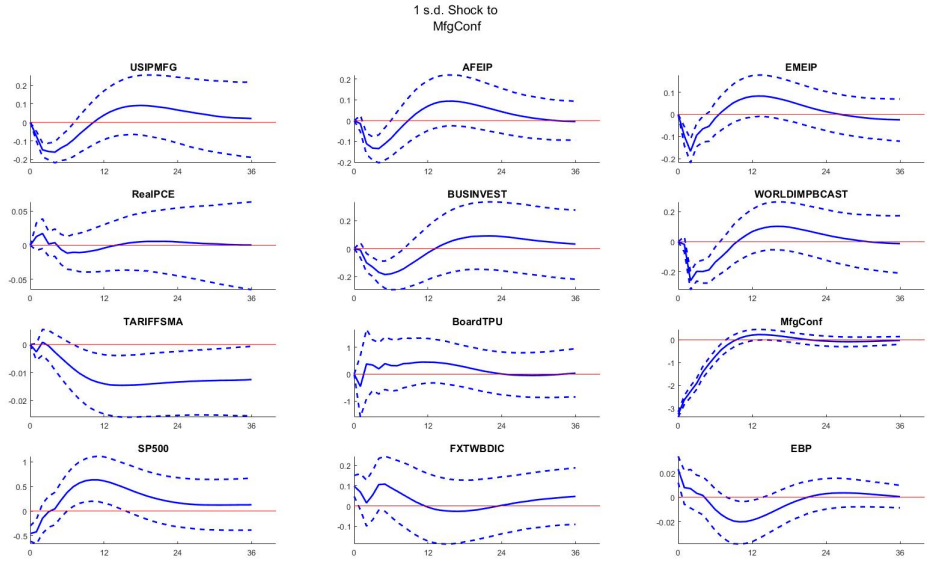
**Notes:** The figure reports responses of the variables conditional on a 1 standard deviation shock to log TPU, where the ordering of the variables coincides with the recursive ordering used to identify the shock. The bands are 68% confidence intervals based on 10000 MCMC draws.

Figure 5: The effect of a TPU shock in the VAR expanded with real PCE, business investment and business sentiment



**Notes:** The figure reports responses of the variables conditional on a 1 standard deviation shock to log TPU, where the ordering of the variables coincides with the recursive ordering used to identify the shock. The bands are 68% confidence intervals based on 10000 MCMC draws.

Figure 6: The effect of a negative business sentiment shock in the VAR expanded with real PCE, business investment and business sentiment



**Notes:** The figure reports responses of the variables conditional on a *negative* 1 standard deviation shock to business sentiment, where the ordering of the variables coincides with the recursive ordering used to identify the shock. The bands are 68% confidence intervals based on 10000 MCMC draws.

independent of higher TPU.

### 3 Conclusions

In this note we revisit the issue of the macroeconomic impact of the recent increase in trade policy uncertainty. Like Caldara et al. (2019a) we do find that potentially high trade policy uncertainty can negatively impact domestic and foreign economic activity, although it is not clear how the underlying mechanism unfolds as models that also include measures of U.S. consumption and business investment spending show either not a significant impact or an economic implausible impact, respectively. Alternatively, we identify a business sentiment channel that is separate and distinct from the trade policy uncertainty mechanism, which we believe provides a complementary explanation of the recent developments in the U.S. and global economic activities. In terms of US economic outlook, our analysis suggests that the mitigation of trade tensions might not coincide with a rebound in economy activity as long as business sentiment does not recover.

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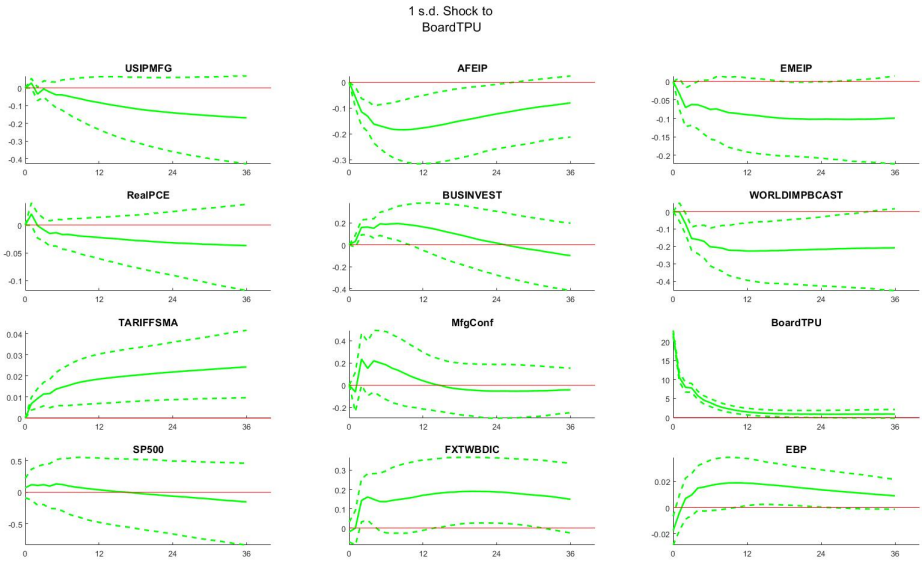
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## A Robustness

In Section 2.2 when exploring the dynamic impact of TPU and negative business sentiment shocks, we identified the two shocks by following a recursive ordering of the series such that in case of TPU shock business sentiment and the financial variables are allowed to respond instantaneously whereas the remaining series can only respond with at least a one-month lag. In case of the negative business sentiment shock, financial variables can respond immediately but TPU and the other variables respond with at least a one-month lag.

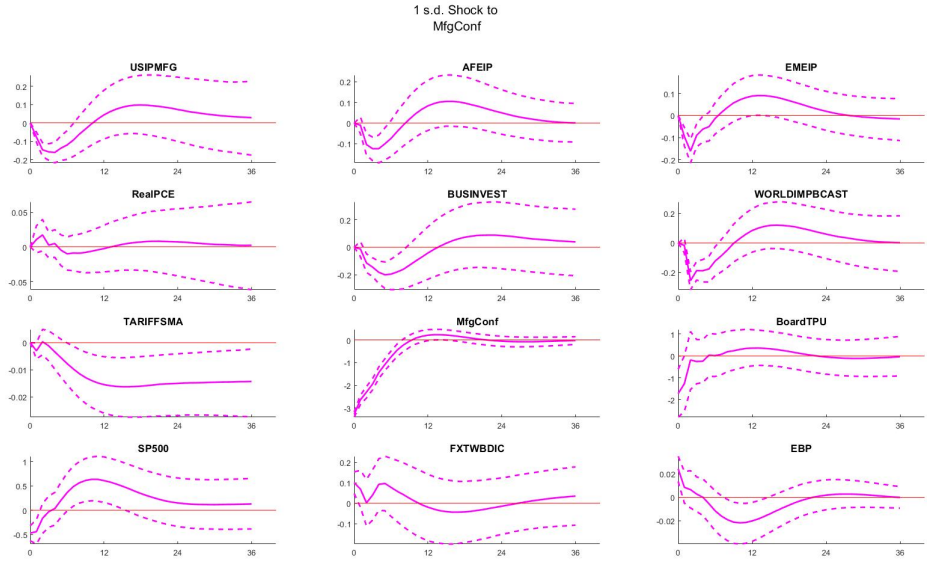
In this Appendix we explore an alternative recursive ordering to identify the two aforementioned shocks: in case of a TPU shock financial variables can respond contemporaneously but business sentiment and the other variables can only respond with a month lag, in case of a negative business sentiment shock TPU and the financial variables can react in the same month and the other variables with at least a one-month delay. Figures A.1 and A.2 report the impulse response functions for this alternative ordering of variables. When comparing the impulse responses in Figures A.1 and A.2 with the corresponding Figures 5 and 6 in Section 2.2, we do not observe any meaningful divergences in the response to the two shocks making the identification robust to the variable ordering.

Figure A.1: The effect of a TPU shock in the VAR expanded with real PCE, business investment and business sentiment (TPU and sentiment reversed)



**Notes:** The figure reports responses of the variables conditional on a 1 standard deviation shock to log TPU, where the ordering of the variables coincides with the recursive ordering used to identify the shock. The bands are 68% confidence intervals based on 10000 MCMC draws.

Figure A.2: The effect of a business sentiment shock in the VAR expanded with real PCE, business investment and business sentiment (TPU and sentiment reversed)



**Notes:** The figure reports responses of the variables conditional on a *negative* 1 standard deviation shock to business sentiment, where the ordering of the variables coincides with the recursive ordering used to identify the shock. The bands are 68% confidence intervals based on 10000 MCMC draws.