Do Fed surprises and financial shocks have sign-dependent effects on real economic uncertainty?*

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Abstract

As real economic uncertainty is to some degree endogenous, this paper studies how this variable responds to Fed surprises and financial shocks. Furthermore, it investigates whether positive shocks have the same effects as negative shocks on real uncertainty. Results from linear local projections support an increase in this indicator after contractionary Fed surprises and unfavorable financial shocks. This paper documents sign-dependent effects of monetary surprises and financial shocks on uncertainty in some circumstances. However, these findings depend on the degree of noisiness of monetary surprises and the financial conditions index used to construct financial shocks.

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1 Introduction

A large literature in macroeconomics investigates the relationship between uncertainty and fluctuations in the real economy. Most of the time, researchers treat uncertainty as drivers of the business cycle or as an exogenous state variable that contributes to amplify the effects of conventional macroeconomic shocks, such as monetary policy surprises. For instance, the seminal work of Bloom et al. (2009) and some structural macroeconomic models, e.g. Leduc and Liu (2016), have focused on this exogenous nature of uncertainty. Pellegrino (2018) exemplified the use of uncertainty measures as an exogenous state in nonlinear empirical models.

Conceptually, however, uncertainty can, at least in part, arise as an endogenous response to macroeconomic developments, and overlooking this feature may distort the transmission mechanism of macroeconomic and financial shocks. Indeed, some recent papers based on dynamic and stochastic general equilibrium models (DSGE), which I will briefly discuss next, support this view of uncertainty as partially responsive to business cycles.

Contribution and Results. This paper studies the responsiveness of real economic uncertainty to Fed surprises and financial shocks and gauges whether positive shocks have the same impact as negative shocks. First, I establish that macroeconomic and financial variables predict real economic uncertainty. Second, in linear local projections, uncertainty significantly responds to the identified shocks. This result complements the empirical evidence based on structural vector autoregressive models supporting uncertainty, to some degree, as a business cycle outcome. Finally, estimated impulse responses allowing for sign-dependent effects reveal that unfavorable monetary policy shocks lead to robust increases in real economic uncertainty. Indeed, sign-dependent effects of monetary surprises already documented for level variables also hold for economic uncertainty, a second-moment measure, under the Bauer and Swanson (2023) orthogonalized surprises. In fact, the literature have not sufficiently documented this nonlinear response of economic uncertainty to monetary policy shocks. However, noisier surprise time series weaken this result. Concerning financial shocks, we see a strong increase in real economic uncertainty after a worsening of financial conditions. Notwithstanding, evidence for a significant sign-depend responses is fragile, depending on which financial conditions indicator we choose as the basis for computing financial shocks.

Related Literature. This paper relates to works that emphasize the endogenous response of uncertainty to aggregate shock. In the context of a structural vector autoregressive model (VAR), Ludvigson et al. (2021) proposed an identification strategy to investigate the endogeneity of their uncertainty measures with respect to the business cycle. Mumtaz and Theodoridis (2020) investigated empirically and theoretically how monetary policy shocks can affect the expected volatility of macroeconomic variables, with special attention to output and inflation. Both papers suggested that uncertainty responded to first-moment shocks and, to some extent, had an endogenous nature with respect to developments in the economy.

Following Ludvigson et al. (2021), Kang and Park (2024) investigated empirically how monetary policy shocks affect different types of uncertainty (financial and macroeconomic). They found that a contractionary monetary policy shock heightened real uncertainty. They also showed that endogenous responses of uncertainty amplify the effects of monetary policy on real activity. In an alternative VAR setup, historical decompositions in Carriero et al. (2018) indicated modest support for economic uncertainty as one of the main drivers of macroeconomic fluctuations, though they did not identify specific first-moment shocks.

On the other hand, Herwartz and Lange (2024) stressed the role of the specification of identification strategies to evaluate if uncertainty was a source or the result of economic fluctuations. They argued that, for set identification, the identifying power of the narrative event and correlation constraints suggested by Ludvigson et al. (2021) was relatively weak, and, consequently, exogenous impulses to uncertainty were mismeasured. Under an alternative identification scheme, Herwartz and Lange (2024) presented evidence that uncertainty could be better interpreted as a source of business cycle. In short, the VAR-based literature lacks consensus and remains unclear on the nature of uncertainty as predominantly endogenous (result of economic fluctuations) or exogenous (source of fluctuations).

Another strand of the literature analyzed endogenous uncertainty in DSGE models and studied the implications of economic agents' behavior for the reaction of uncertainty to level shocks. Plante et al. (2018) investigated the correlation between uncertainty and the output growth, especially under the zero lower bound (ZLB) constraint. They emphasized the role of productivity and discount factor level shocks as drivers of this correlation before and after the economy reached the ZLB. Following Mumtaz and Theodoridis (2020), who built a DSGE model with labor market frictions, Bernstein at al. (2024) underlined the role of labor search and matching frictions in generating countercyclical output uncertainty and suggested causality running from economic activity to uncertainty. Ascari et al. (2023) studied shocks to inflation expectations, showing that, in a DSGE model with firm dynamics, the endogenous increase in uncertainty is important for the amplification of the transmission mechanism and provides robust sign restrictions to empirically identify these shocks. Finally, Straub and Ulbricht (2024) developed a theory of endogenous uncertainty in which investors learn about firm-level fundamentals, pointing out that financial crises impaired this learning process, causing an increase in uncertainty.

Outline. The paper proceeds in four additional sections. In the second section, I present data and discuss econometric methodology. The third section presents the results for the baseline specifications concerning the impact of monetary surprises and financial shocks on real economic uncertainty. The fourth section explores the robustness of the baseline results to changes in the way one can measure shocks and real uncertainty. The last section offers final comments and directions for future research.

2 Econometric Framework

This section discusses data and shows that macroeconomic and financial variables explain more than 60% of the time series variation in real economic uncertainty measures. Therefore, they are not completely exogenous to developments in the economy and should respond to macroeconomic and financial shocks. In addition, I briefly introduce local projections and present the empirical setup, including impulse variables or shocks, response variables, and the lag structure for control variables in horizon-specific regressions.

2.1 Data

In this subsection, I describe the data used for the empirical analysis concerning the responses of real economic uncertainty to monetary surprises and financial shocks. The sample comprises monthly time series from February 1988 to December 2019. The initial date corresponds to the availability of the Bauer and Swanson (2023) series. Moreover, I exclude the COVID-19 pandemic period because its effects could have disrupted patterns and co-movements related to macroeconomic variables.

Macroeconomic variables and Stock Prices:

I collected a set of macroeconomic indicators and financial variables from the FRED database, hosted by the Federal Reserve Bank of Saint Louis[1]. As dependent variables in local projections, I used industrial production, unemployment, and the S&P500 index. In addition, the lags of the Wu-Xia shadow Federal Funds rate and the CPI acted as control variables in local projections. The ten-year yields on government bonds were one of the regressors in the process of extracting financial shocks and were employed in the empirical specifications showing that real economic uncertainty are predictable by macroeconomic and financial data. For this predictability exercise, I also considered housing prices and the disaggregated components of the Chicago Fed National Activity Index (CFNAI)[2].

Real Economic Uncertainty Proxies:

Ludivigson and Ng (2021) computed the real uncertainty indices that I used in this paper. These authors emphasized that economic decision-making are related to the predictability of the economy as whole, not simply the variability of a limited set of real economic indicators. The real economic uncertainty indices are calculated by aggregating the individual uncertainty in a large collection of real macroeconomic variables. For each indicator, individual uncertainty obtains by isolating the unforecastable component's conditional volatility in the future, therefore purging the uncertainty indicator from any forecastable component. The following expression describes this procedure for a given indicator $y_{j,t}$.

[1] https://fred.stlouisfed.org/

[2] https://www.chicagofed.org/research/data/cfnai/current-data

$$u_{j,t}^{R}(h) = \sqrt{E\left[\left(y_{j,t+h} - E\left[y_{j,t+h} \mid I_t\right]\right)^2 \mid I_t\right]}$$

The symbol I_t denotes the information set available at time t and E is the expectation operator, the variable h is the forecasting horizon. Indeed, this is a forward-looking measure of volatility, not necessarily related to the one realized in the past. The real economic uncertainty index h-period ahead is the average of $u_{j,t}^{R}(h)$ across a large group of real macroeconomic variables.

I consider real economic uncertainty for one-month, three-month, and twelve-month horizons. The online appendix for Ludivigson and Ng (2021) describes the data set used to compute the real uncertainty measures, which comprises information from real economic indicators compiled in the FRED-MD monthly database.[3]

The raw real economic uncertainty indices are public available at Ludivigson's website[4]. Due to its high volatility, in the empirical section of this paper, I worked with twelve-month moving averages of the raw measures.

Next, I present evidence that support the claim that real economic uncertainty is, at least in part, a byproduct of developments in the macroeconomy. I establish that more than 60% time-series variation in each real economic uncertainty proxy can be explained by simple sets of lagged macroeconomic and financial variables. Table 1 presents the adjusted R^2 related to the empirical analyses in which real economic uncertainty proxies were regressed on alternative sets of macroeconomic and financial variables. I used four lags of the following sets of indicators as explanatory variables in rhese regressions. The first set includes: log industrial production, unemployment, log of consumer price index (CPI), log of the S&P 500 index, and the Fed Funds rate.

[3] https://www.stlouisfed.org/research/economists/mccracken/fred-databases

[4] https://www.sydneyludvigson.com/macro-and-financial-uncertainty-indexes

The second set comprises the log industrial production, unemployment, log of CPI, log of housing prices, and the ten-year yields on government bonds. Finally, the third set groups log of CPI, the Fed Funds rate and four subindices from the CFNAI index[5]. All specifications include a time trend and the lag order for the explanatory variables is four.

In the Table 1, the reported adjusted R-squared statistics represent the variations explained by the variables in the regressions. The real uncertainty proxies are: REU1 (one-month horizon), REU3 (three-month horizon) and REU12 (twelve-month horizon). Looking at Table 1, we can see that more than 60% of the variations in uncertainty is due to movements in macroeconomic and financial variables in levels.

Table 1: Adjusted R^2 for Predictability

Variable	First Set	Second Set	Third Set
REU1	0.64	0.62	0.68
REU3	0.65	0.63	0.72
REU12	0.67	0.65	0.75

Monetary Policy Surprises:

I used surprises put forth by Bauer and Swanson (2023), available at the Center for Monetary Research of the Federal Reserve Bank of San Francisco[6]. The baseline results considered the version that controls for the correlation between the raw surprises and data that are publicly available prior to the FOMC announcement (macroeconomic and financial time series) . Indeed, as a robustness exercise, I also employed the raw measure computed by evaluating high-frequency changes in interest rates around FOMC announcements

[5] These subindices are: i) production and income; ii) employment, unemployment, and hours; iii) personal consumption and housing; iv) sales, orders, and inventories.

[6] https://www.frbsf.org/research-and-insights/data-and-indicators/monetary-policy-surprises/

that include speeches by the Fed Chair, but without orthogonalizing them with respect to macroeconomic and financial data that pre-date each announcement.

As a robustness check, I also estimated local projections with surprises from Jarocinski and Karadi (2020), available at Jarocinski's website[7], and starting from January 1990. Since Central Bank announcements simultaneously convey information about monetary policy and the central bank's assessment of the economic outlook, Jarocinski and Karadi (2020) proposed a methodology for disentangling pure monetary policy surprises from Central Bank Information shocks. In section 4, I used these monetary policy surprises that were not contaminated by this information component.

Figure 1 displays the three surprises starting from January 1990. This figure atests the high degree of co-movement among these time series. In fact, one can see that the raw surprises from Bauer and Swanson (2023) are more volatile than their orthogonalized counterpart. Moreover, the series from Jarocinski and Karadi (2020) are also very volatile. This additional volatility of these non orthogonalized shocks may reflect a non negligeable amount of noise.

Shocks to Financial Conditions:

I followed Gilchrist and Zakrajšek (2012) and Barnichon et al. (2022) in computing financial shocks as the residuals, in a VAR, of the equation associated with an indicator for financial conditions. By ordering macroeconomic variables (slow moving) before this indicator and financial variables (fast moving) after, the financial sector responds immediately to any deterioration in financial conditions while the macroeconomy reacts with one-period lag. In addition to an indicator for financial conditions, the variables in the

[7] https://marekjarocinski.github.io/jkshocks/jkshocks.html

four-lag VAR are: unemployment, the variation in the log of industrial production, inflation, the return of the S&P 500, the FED Funds rate, and the ten-year yields on government bonds.

To measure financial conditions, I use the following indicators: the Excess Bond Premium (EBP) computed in Gilchrist and Zakrajšek (2012), which is publicly available and regularly updated[8], the National Financial Conditions Index (NFCI) released periodically by the Federal Reserve Bank of Chicago[9], and the three-month moving average of the Financial Conditions Impulse on Growth (FCIG3) from the Board of Governors of the Federal Reserve[10]. Figure 3 shows these indicators of financial conditions and confirms that they present a high degree of co-movement. Moreover, the NFCI index presents the highest volatility among the three time series.

2.2 Local Projections(LP)

Following Jordá (2005), I choose to estimate local projections (LP) to compute impulse responses and study the dynamic effects of economic shocks. For each horizon h, this method consists in running a regression connecting a dependent variable y_{t+h} to a particular shock x_t of interest and a set of c controls w_{it-l} with lag order p. Indeed, LP are widely used in empirical macroeconomics due to its flexibility and robustness to possible misspecifications in finite sample, according to Plagborg-Mϕller & Wolf (2021) and Olea & Plagborg-Mϕller (2021). Additionally, LP represent a parsimonious way of modelling asymmetric and state-dependent effects of shocks. The following expression describes the horizon-specific regression:

[8] https://www.federalreserve.gov/econres/notes/feds-notes/updating-the-recession-risk-and-the-excess-bond-premium-20161006.html

[9] https://www.chicagofed.org/research/data/nfci/current-data

[10] https://www.federalreserve.gov/econres/notes/feds-notes/a-new-index-to-measure-us-financial-conditions-20230630.html

$$y_{t+h} = \alpha_h + \delta_h t + \beta_h x_t + \sum_{i=1}^{c}\sum_{l=1}^{p} \gamma_{hil} w_{it-l} + \varepsilon_{h,t} \tag{1}$$

Equation (1) specifies a constant and a linear time trend with coefficients α_h and δ_h. Moreover, γ_{hil} are the projection parameters for the control variables, which may include lags of the response variable y_t. Finally, I compute impulse responses of y_t to x_t as a sequence of the coefficients β_h, for horizons $h = 1, 2, ..., H$.

Note that this setup is a linear specification that could be easily adapted to handle nonlinear effects of x_t on y_t. More precisely, this paper evaluates whether positive shocks have the same impact as negative shocks on macroeconomic variables, the stock market, and real economic uncertainty. One can investigate this feature by performing the following regression:

$$y_{t+h} = \alpha_h + \delta_h t + \beta_h^+ \max\{x_t, 0\} + \beta_h^- \min\{x_t, 0\} + \sum_{i=1}^{c}\sum_{l=1}^{p} \gamma_{hil} w_{it-l} + \varepsilon_{h,t} \tag{2}$$

The information set in both regressions is the same, but expression 2 allows researchers to test for sign-dependent impulse responses. For positive shocks, the impulse responses correspond to the coefficients β_h^+, while for negative shocks they coincide with the coefficients β_h^-, for horizons $h = 1, 2, ..., H$. In this setup, a perfect symmetric transmission of economic shocks implies the restriction $\beta_h^+ - \beta_h^- = 0$. In contrast, the effects of the shocks are sign-dependent when the difference $\beta_h^+ - \beta_h^-$ is significantly different from zero, denoting divergent sequences β_h^+ and β_h^-.

Concerning economic shocks, the investigation of nonlinearities by sign is a recurrent theme. For instance, Tenreyro & Thwaites (2016) examined monetary policy shocks, Finck & Rudel (2023) studied credit supply shocks, and

Ben Zeev et al. (2023) explored fiscal shocks and multipliers. In this paper, I revisit this issue and focus on the responses of real economic uncertainty proxies in comparison with how macroeconomic and financial variables react to Fed surprises and financial shocks.

If the observed shock x_t is a noisy proxy for the true shock of interest, it can still be useful as an instrumental variable for the estimation of regressions analogous to (1) and (2) in which changes in the interest rates or in financial condition proxies, now endogenous, replace x_t as impulse variables. In this case, the local projection instrumental variable (LP-IV) approach estimates the impulse responses using a two-stage least squares version of LP. In the next section, I also report impulse responses based on estimations that used LP-IV.

I now discuss the main specification for expressions (1) and (2). I set $p = 4$ and $H = 18$. The impulse variables are monetary policy surprises and financial shocks discussed in the previous subsection. They also worked as instruments for specifications that included the changes in the Fed Funds rate and in the Excess Bond Premium as endogenous impulse variables. I use lags of the following variables as controls: economic uncertainty, unemployment, the logarithm of industrial production, the logarithm of the S&P500 index, the logarithm of the CPI index, and the Fed Funds rate. The main response variable is the real economic uncertainty described in Ludvigson et al. (2021).

As a way of comparing the sign-dependent effects of the shocks on uncertainty to the ones on the real economy and financial markets, I also consider unemployment, the logarithm of industrial production, and the logarithm of the S&P500 index as additional response variables. Under LP specifications given by equations (1) and (2), the next section shows responses for these four variables to monetary surprises and financial shocks.

3 Empirical Results

This section reports the main results of the paper. First, I report LP estimations by ordinary least squares method with observable shocks. I then present the results concerning the instrumental variable approach, in which the shocks act as instruments for changes in interest rates and financial conditions indices.

3.1 Baseline Results

I estimate equations (1) and (2) by OLS, considering monetary policy shocks and financial shocks as impulses. In the following empirical exercise, I use the Bauer & Swanson (2023) orthogonalized monetary surprises that remove from this measure the component correlated with economic and financial data. In addition, the baseline financial shock is the residual of a predictive equation for the Excess Bond Premium (EBP) as explained in section 2. Next, I report the main findings concerning impulse responses of real economic uncertainty to both shocks, comparing them to the reactions of macroeconomic variables and stock prices.

Monetary Surprises:

Figure 3 displays the impulse responses after a monetary policy shock in the linear specification, and the grey shaded area represents the 68 percent confidence band. A contractionary monetary policy impacts negatively economic activity (industrial production decreases and unemployment rises) and stock prices decease. These reactions are significantly different from zero for most of the horizons. Indeed, the results in Figure 3 agrees with the predictions of conventional macroeconomic models. Further, over all horizons, real economic uncertainty increases. This last finding agrees with results reported in Mumtaz and Theodoridis (2020) and the effects of Fed surprises on economic uncertainty are similiar to the ones from inflation expectations shok documented in Ascari et al. (2023).

Figure 4 exhibits the impulse responses after favorable (expansionary) and unfavorable (contractionary) monetary surprises. The third column of Figure 4 shows the difference in the estimated parameters of restrictive (β_h^+) and loose monetary shocks (β_h^-). An easy monetary policy leads to no significant effect on industrial production and unemployment. These variables clearly decrease under high interest rates. For these variables, the evidence of a sign-based response is very clear. The third row of Figure 4 shows an increase in stock prices after favorable monetary surprises in the sort-run. In contrast, tight monetary policy leads to a persistent decrease in stock prices. We see a significant sign-based behavior, especially after six months.

Inspecting the last column of Figure 4, one can see a slight decrease in uncertainty over the medium horizon and a decisive and significant increase after interest rate hikes. In fact, $\beta_h^+ - \beta_h^-$ is significantly different form zero after eight months. In short, there is evidence of sign-based behavior for real economic uncertainty, which is weaker when compared with the results related to economic activity.

Financial Shocks:

Figure 5 depicts the impulse responses after a financial shock in the linear specification, and the grey shaded area represents the 68 percent confidence band. An increase in EBP leads, qualitatively, to responses like the ones described before for monetary surprises. Indeed, industrial production decreases, unemployment increases, and stock prices plunge after the shock. Analogous to its response to a restrictive monetary policy shock, real economic uncertainty increases, with statistically significant effects after the fourth month. Monetary surprises and financial shocks yield similar pattern of responses.

Figure 6 shows results related to the nonlinear specification (2). In contrast to its response to monetary surprises, industrial production increases after a drop in EBP (favorable shock) and decreases after a deterioration in financial conditions. Looking at the first row and the last column of Figure 6, the reaction to an unfavorable shock seems stronger. In the second row of this figure, unemployment decreases in some horizons responding to a decrease in EBP and increases consistently with tighter financial conditions, though the difference in responses is not statistically significant. Overall, economic activity react mildly to a favorable financial shock. Opposing the results in Figure 4, stock prices present no significant reaction to a drop in EBP, reacting strongly to an adverse financial shock. Finally, real economic uncertainty seems to respond strongly only to adverse financial shocks, but the sign-dependency is statistically negligible according to the last row and last column of Figure 6.

In short, the evidence of sign-dependency is strong concerning industrial production and stock prices, but weak for unemployment and real economic uncertainty. This result contrasts to the responses to monetary surprises that point to sign-based reactions of all variables.

3.2 Instrumental Variable Results

I estimate equation (1) and (2) using the shocks as instruments to changes in the Fed Funds rate (FFR) and in the Excess Bond Premium (EBP), the baseline measure for financial conditions. In what follows, I compare the results of the LP-IV estimation with the ones just examined in (3.1).

Monetary Surprises:

Figure 3 and Figure 7 yield similar results for all variables. Thus, after a contractionary monetary shock, the linear specification suggests a drop in industrial production, an increase in unemployment, a persistent decrease in stock prices, and a rise in real economic uncertainty.

Comparing Figure 4 (baseline) and Figure 8 (LP-IV), industrial production, unemployment, and the stock prices respond similarly to contractionary and expansionary shocks. However, inspecting the last column, the evidence supporting sign-based effects is weak compared with the baseline case.

Regarding uncertainty, impulse responses in Figure 4 and Figure 8 are different. In fact, under LP-IV, this variable decreases after loosening surprises and increases in long horizons if the shock is contractionary. But this difference is statistically negligeable according to the plot in the fourth row and third column in Figure 8.

Summing up, the results from LP-IV differ from the baseline, pointing to more volatile parameter estimates and leading to weak evidence on sign-based effects of Fed surprises.

Financial Shocks:

Figure 5 and Figure 9 are very similar. According to the linear model, the responses to adverse financial shocks are qualitatively the same as the reactions to monetary policy surprises, leading to a weakening of economic activity and stock prices. Furthermore, real economic uncertainty surges.

Inspecting Figure 6 and Figure 10, we see that the impulse responses are extremely similar. Hence, LP-IV estimation supports very strong evidence against sign-based reaction due to very volatile estimates, especially under favorable financial shocks.

4 Robustness

4.1 Alternative REU proxies

I consider the impact of monetary surprises and financial shocks on real economic activity proxies, which differ because they consider alternative horizons (one, three and twelve months) for future expected volatility based on composites of real macroeconomic indicators.

Monetary Surprises:

Regarding the response to monetary surprises, Figure 11 suggests that real economic uncertainty rises no matter the proxy used. In addition, Figure 12 supports a strong increase in real economic uncertainty for adverse monetary surprises but a mild decrease or no effect following an expansionary monetary policy shock. Across all proxies for uncertainty, we can see significant sign-based responses, especially for long horizons.

Financial Shocks:

Figure 13 shows that real economic uncertainty rises no matter the proxy used after four or five months, but not in the very short horizon. In addition, after the third month, Figure 14 supports a strong increase in real economic uncertainty for adverse monetary surprises but no effect of loosening monetary policy. Across all proxies for uncertainty, the evidence of sign-dependent behavior is very weak, with statistical significance only for few horizons.

4.2 Alternative Monetary Policy Surprises

I repeat the baseline exercise using two alternative surprises. The first one is the raw surprises computed in Bauer and Swanson (2023) without any orthogonalization with respect to news that can forecast these surprises.

Raw Bauer and Swanson surprises:

Figure 3 and Figure 15 display similar results for all variables. Thus, after interest rates rise, the LP estimation indicates a drop in industrial production, an increase in unemployment, a persistent decrease in stock prices, and higher real economic uncertainty for medium and long horizons.

Comparing estimations for the specification (2), summarized in Figure 16, with the baseline (Figure 4), one can see strong similarities, though impulse responses are less accurate in Figure 16 because the raw Bauer and Swanson series are noisier than its orthogonalized version. Overall, for all variables we see some evidence of sign-based effects of the monetary shocks, especially in long horizons.

Jarocinski and Karadi surprises:

Figure 3 and Figure 17 show similar patterns for all variables under the linear specification. Indeed, after the Central Bank tightens monetary policy, impulse responses suggest a drop in industrial production, an increase in unemployment, a persistent decrease in stock prices, and, for medium and long horizons, a rise in economic uncertainty.

Figure 18 shows little support for sign-based reactions concerning real economic uncertainty. For the remaining variables, one can see only weak evidence of sign-based effects of monetary shocks. These features are consequences of a noisier measure for Fed surprises.

4.3 Alternative Financial Shocks

I use two alternative financial conditions indices in place of the EBP to compute financial shocks. The first consider the National Financial Condition Index (NFCI) from the Federal Reserve Bank of Chicago, the second is the three-month moving average of the Financial Conditions Impulse on Growth (FCIG3).

Shocks based on NFCI:

Inspecting Figure 19, for all impulse responses, we see striking similarities with the baseline (Figure 5). Again, economic activity is adversely affected (one observes a drop in industrial production and a rise in unemployment), stock prices plunge, and real economic uncertainty significantly hikes.

By looking at Figure 20, we see that impulse response are accurately estimated and support, for all variables, sign-based responses. Therefore, NFCI introduces less noise in the estimation process than the EBP variable, from which I extract the baseline financial shocks.

Shocks based on FCIG3:

Figure 21 shows similarities with the baseline (Figure 5) and to impulses based on the NFCI index (Figure 19) for industrial production, unemployment, and stock prices. Though one can see a rise in real economic uncertainty after the financial shock, this reaction is estimated with very high dispersion. Hence, uncertainty responses are not significantly different from zero.

The results in Figure 22 resembles the ones reported in Figure 6 (the baseline case) for economic activity variables and stock prices. However, impulses to shocks constructed from the FCIG3 indicator point to an increase in real economic activity no matter the sign of the shock. Moreover, I document a strong support for sign-based effects related to financial shocks.

5 Conclusion

Considering real economic uncertainty, in part, as resulting from developments in the macroeconomy, I investigated its responses to Fed surprises and financial shocks. Furthermore, I searched for empirical evidence of whether positive and negative shocks have different effects on economic uncertainty. Linear local projections showed that real uncertainty rose after contractionary Fed surprises and unfavorable financial shocks. Furthermore, for some empirical specifications, I found sign-dependent effects of monetary surprises on real economic uncertainty. However, robustness checks suggested that these nonlinear effects depend on the degree of noisiness of monetary surprises and the choice of the indicator for financial conditions used in the procedure of obtaining financial shocks.

Leveraging on the flexibility of the local projections framework and using the data recentely constructed by Londono et al. (2024), an extension of this research could look at cross-country panel evidence on the effects of economic shocks on real economic uncertainty, focusing on the state-dependent effects of these shocks according to alternative variables that may trigger regime transitions as in Alpanda et al. (2021).

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FIGURES

Figure 1. Monetary Policy Surprises

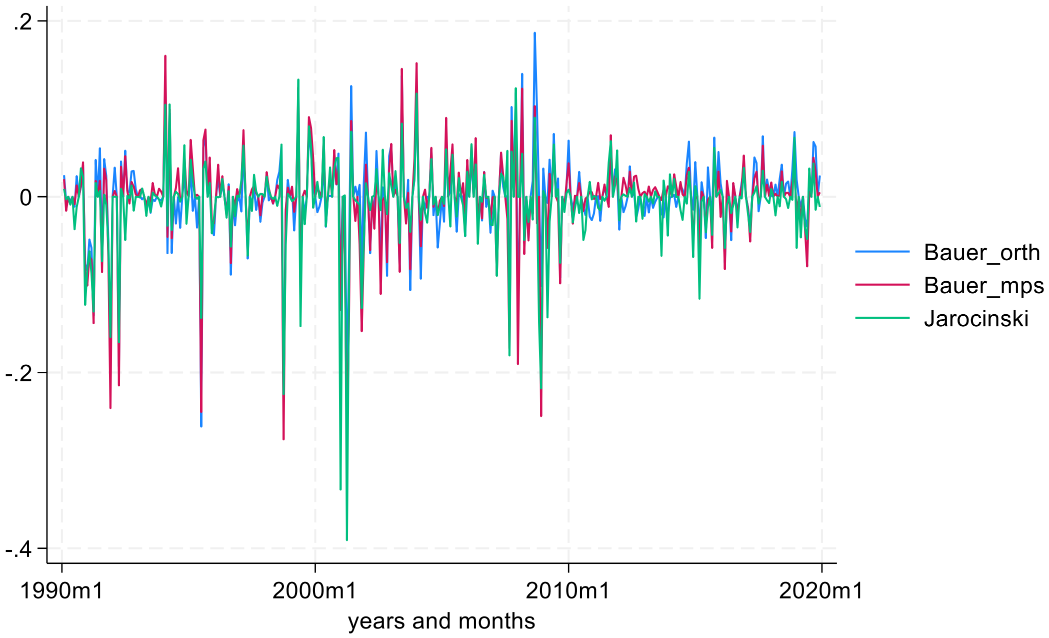

Figure 2. Financial Conditions Indexes

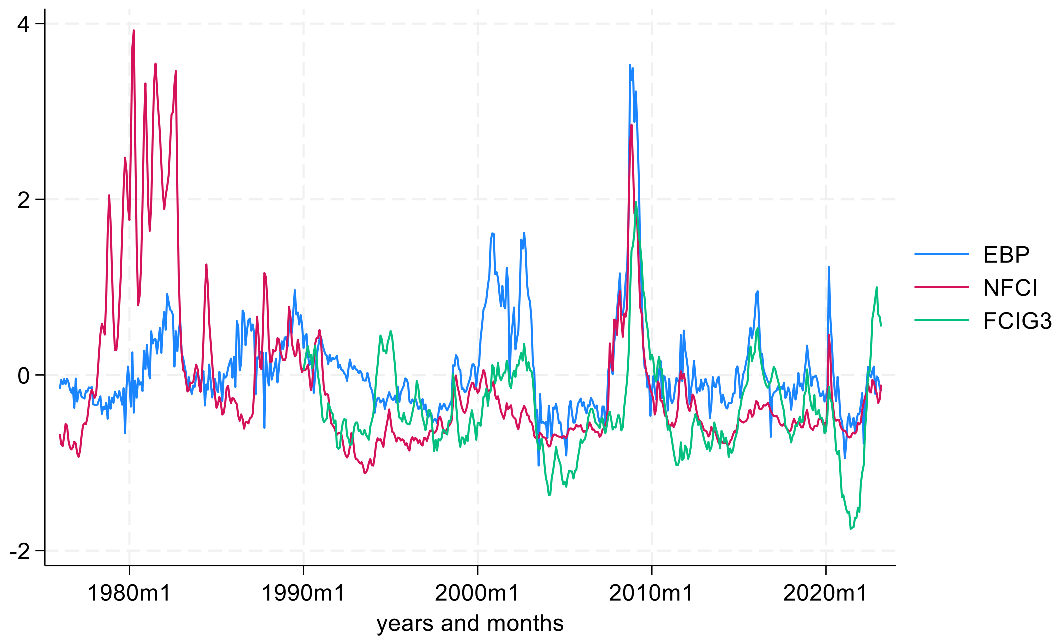

Figure 3: Responses to Monetary Policy Surprises (baseline: linear)

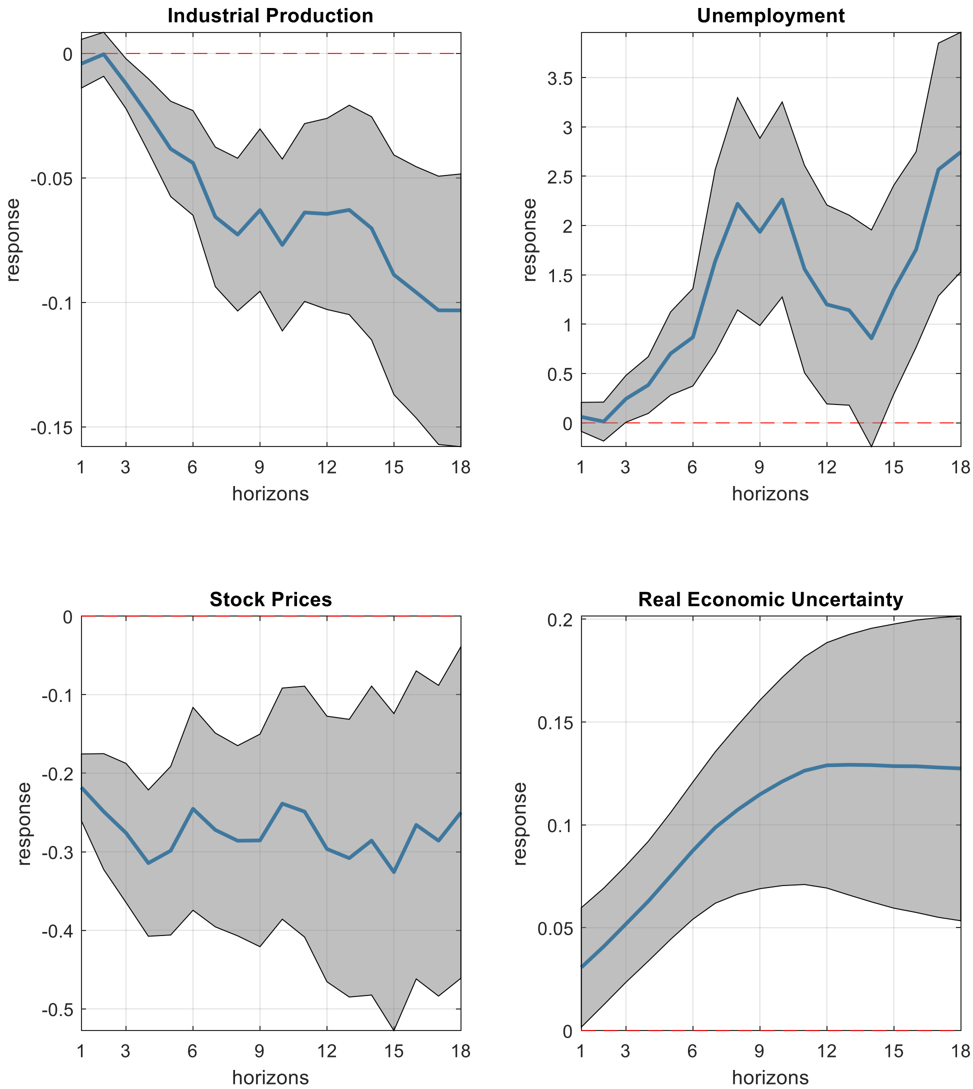

Figure 4: Responses to Monetary Policy Surprises (baseline: sign-based)

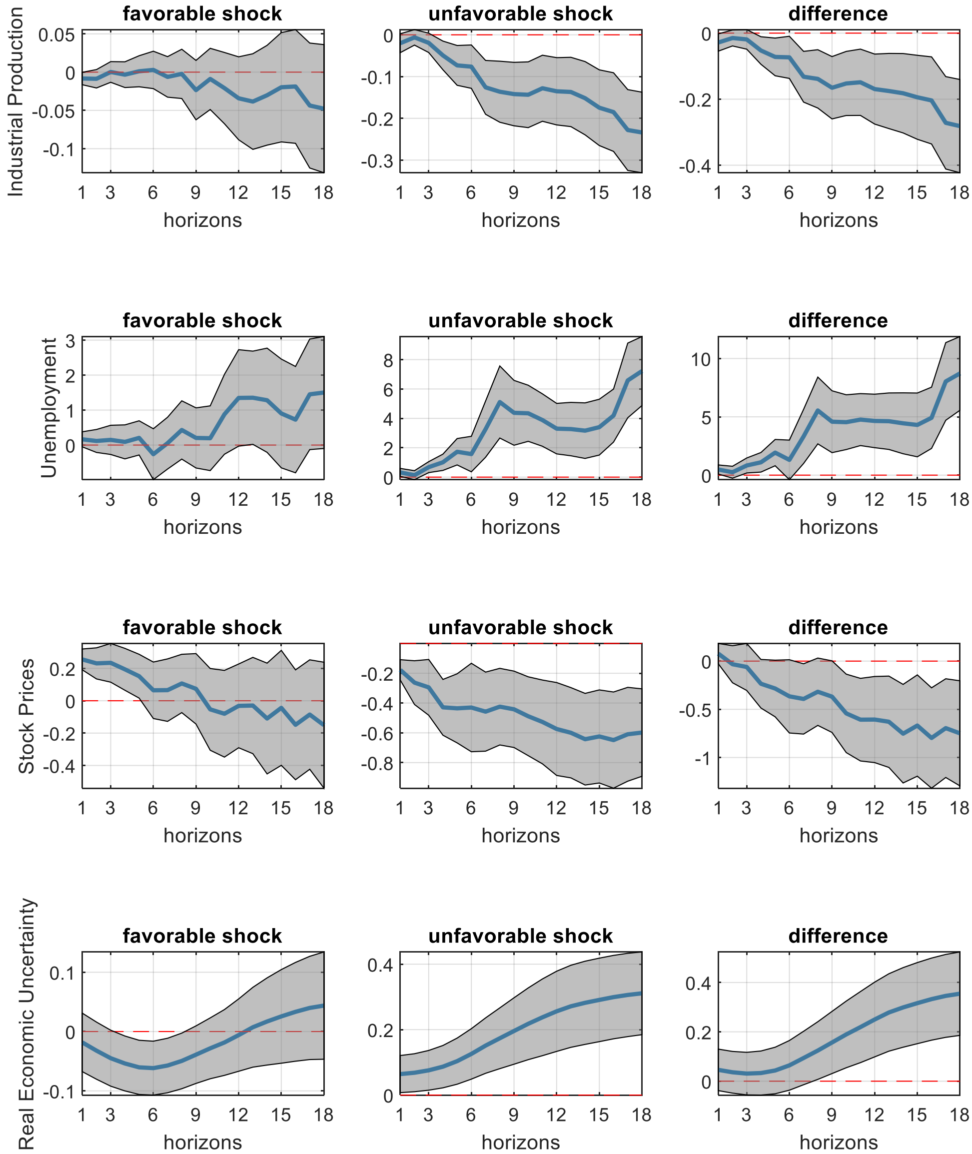

Figure 5: Responses to Financial Shocks (baseline: linear)

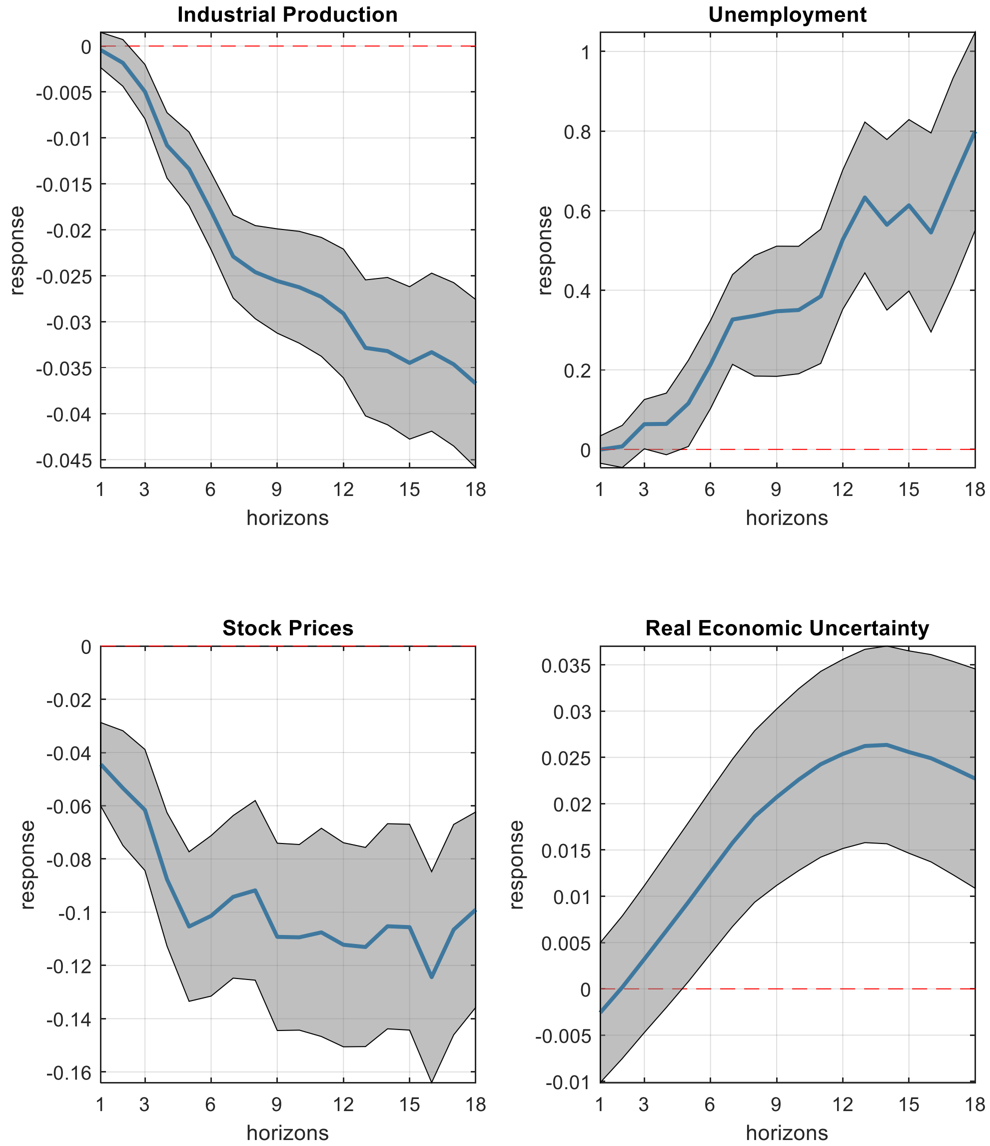

Figure 6: Responses to Financial Shocks (baseline: sign-based)

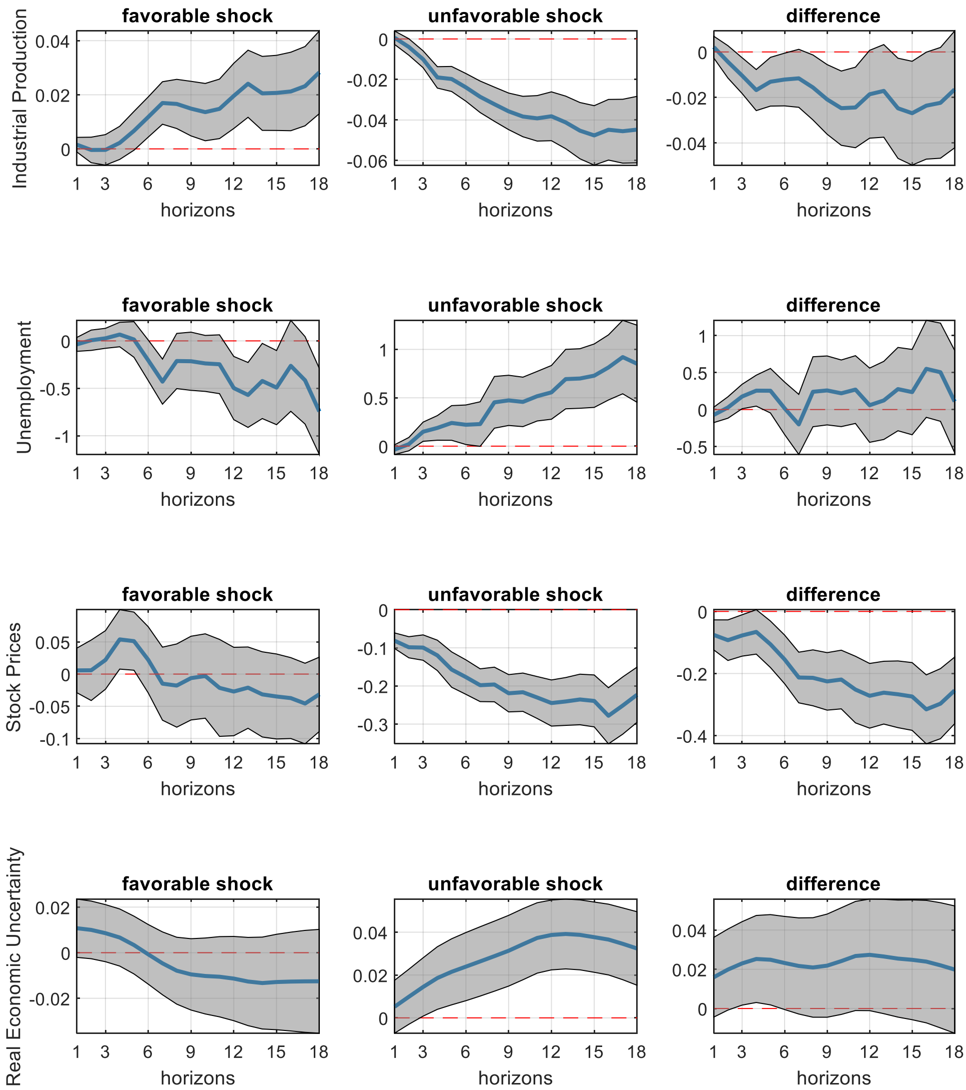

Figure 7: Responses to Monetary Policy Surprises

(instrumental variable: linear)

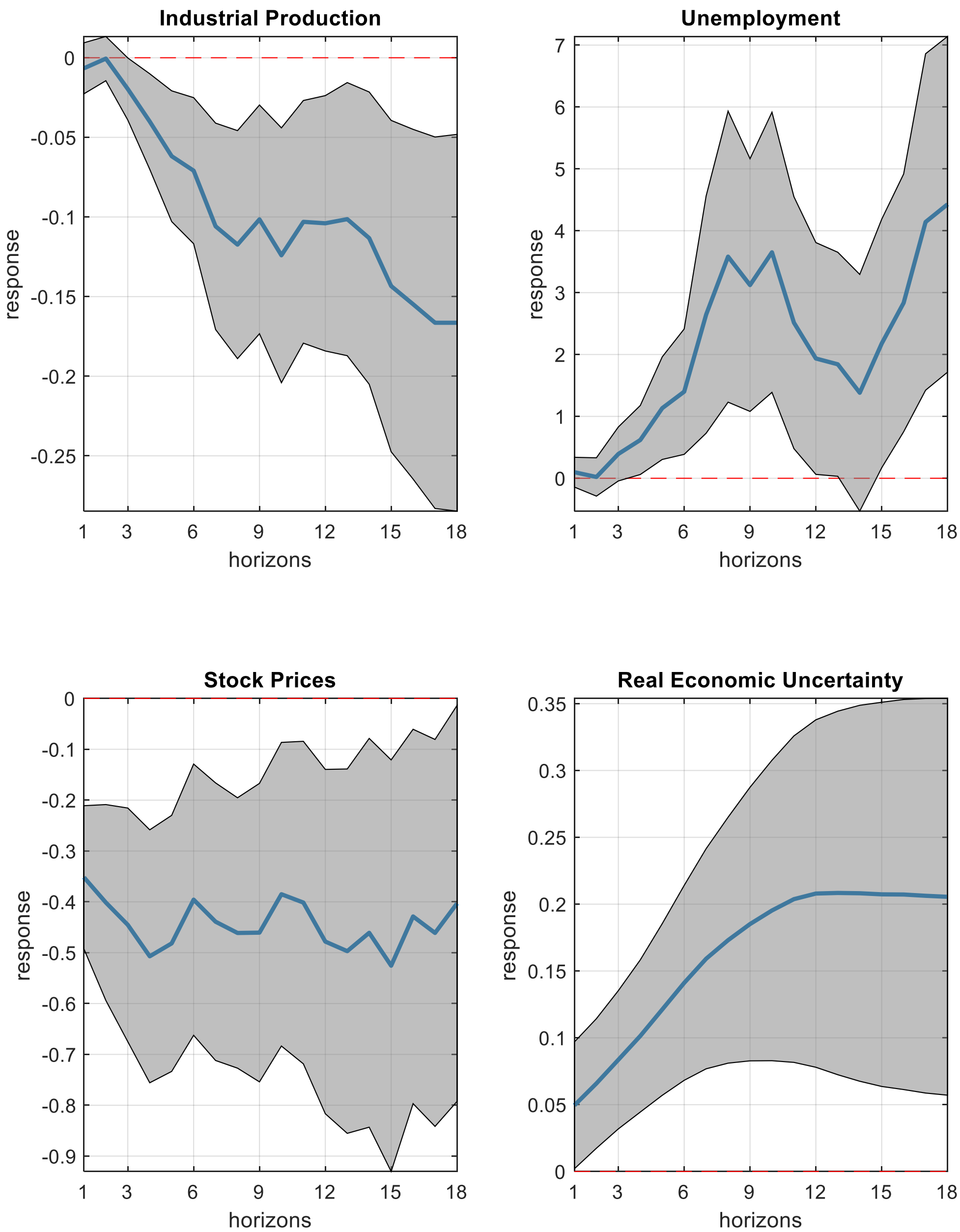

Figure 8: Responses to Monetary Policy Surprises

(instrumental variable: sign-based)

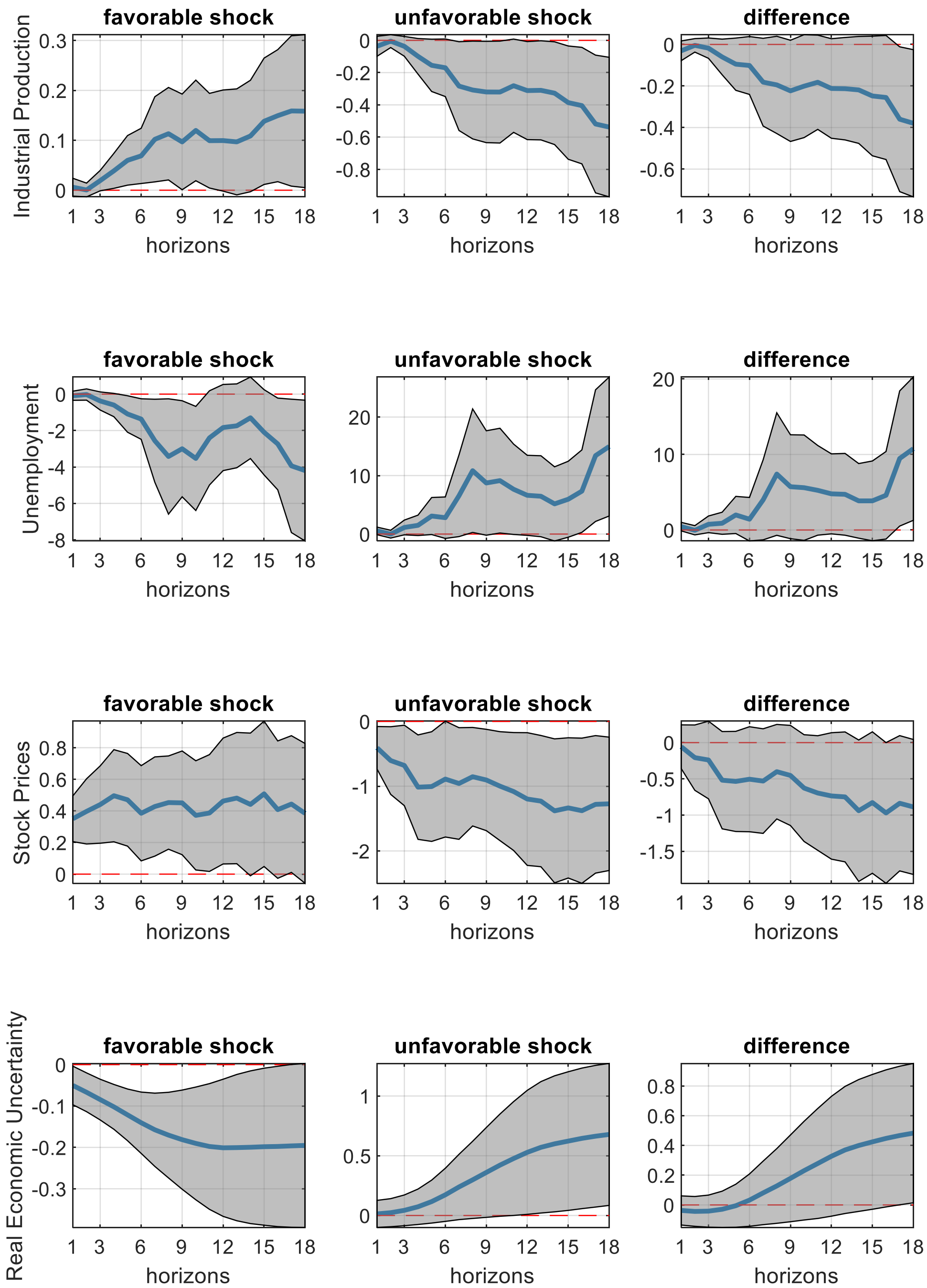

Figure 9: Responses to Financial Shocks

(instrumental variable: linear)

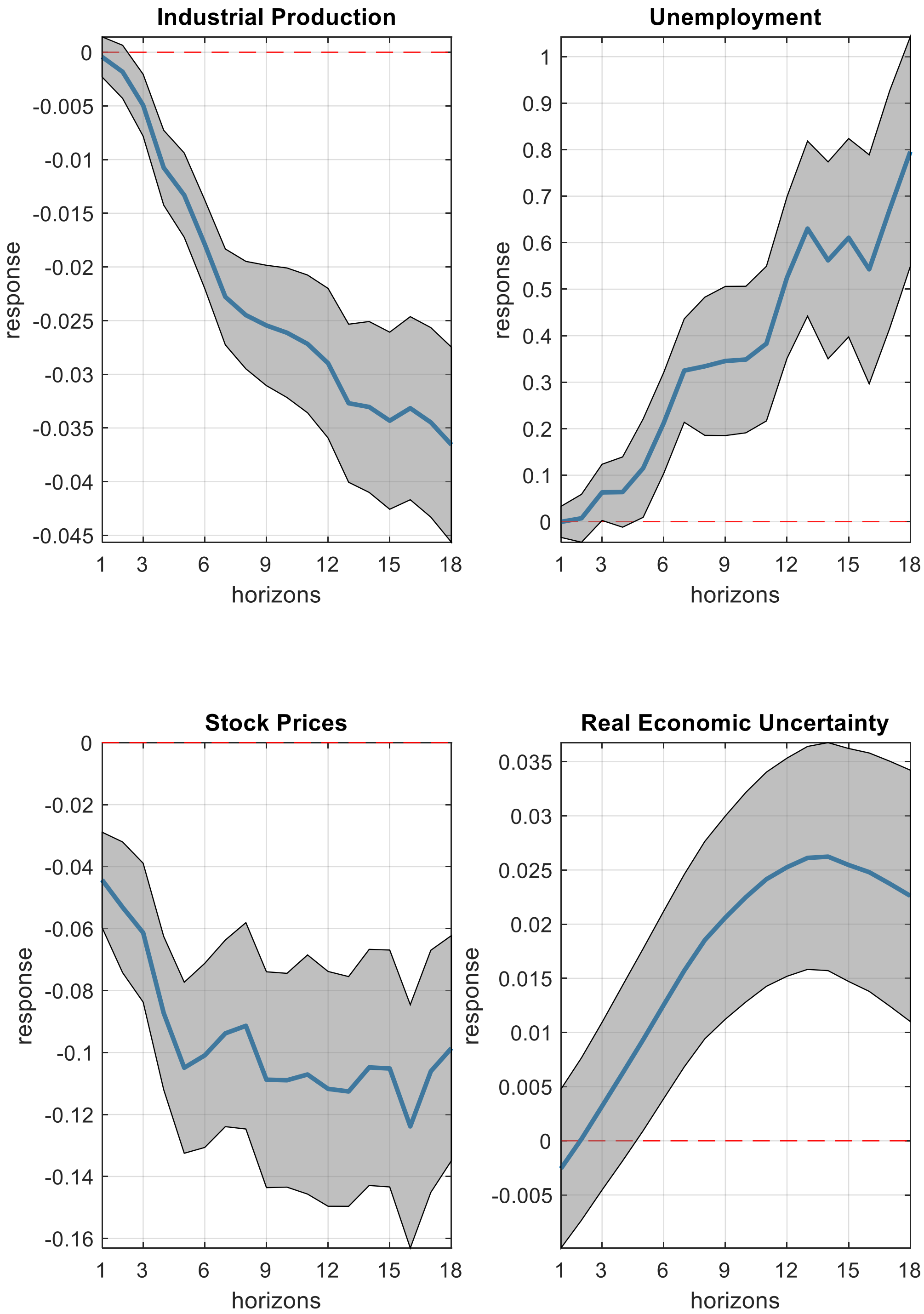

Figure 10: Responses to Financial Shocks

(instrumental variable: sign-based)

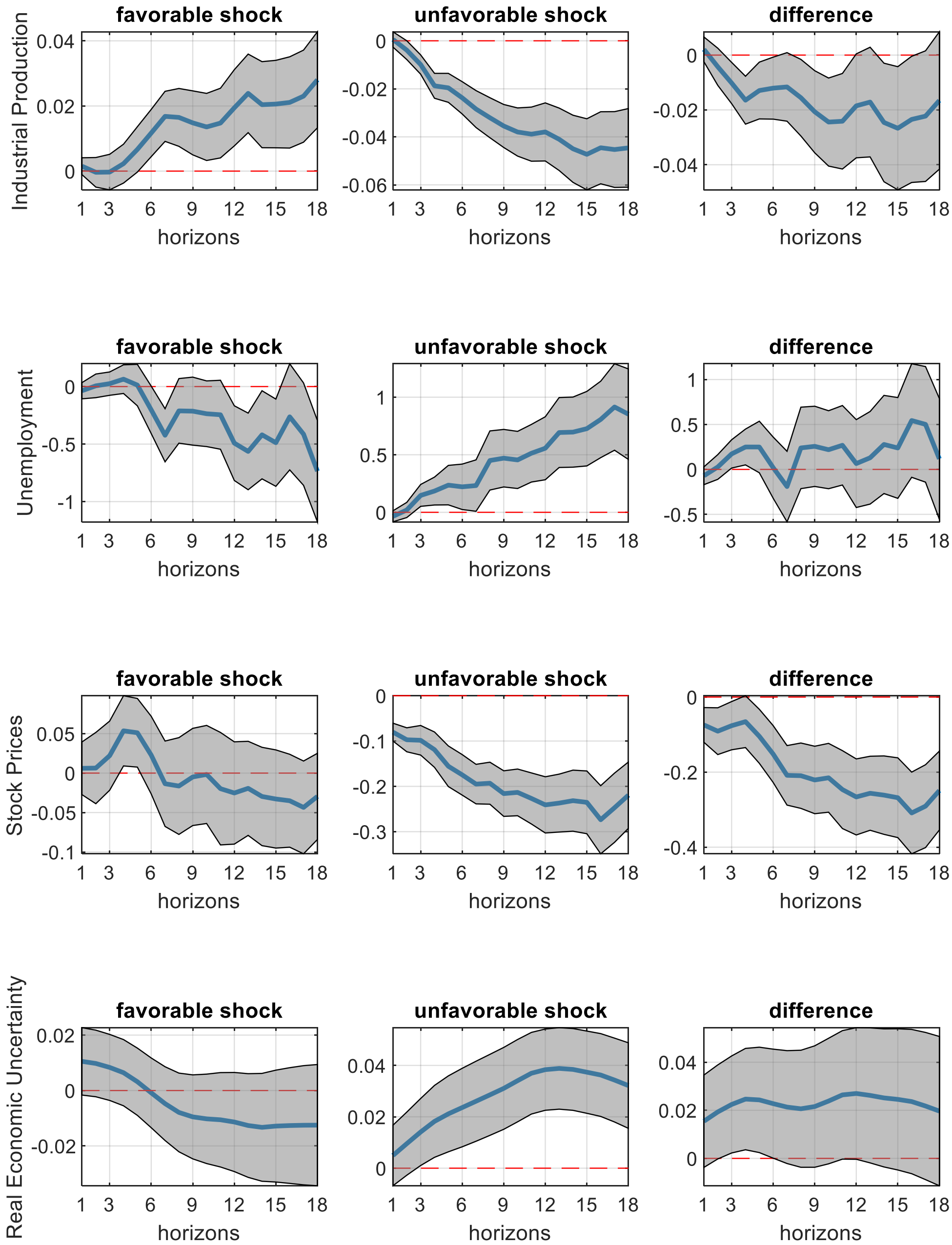

Figure 11: Responses to Monetary Policy Surprises (alternatives REU: linear)

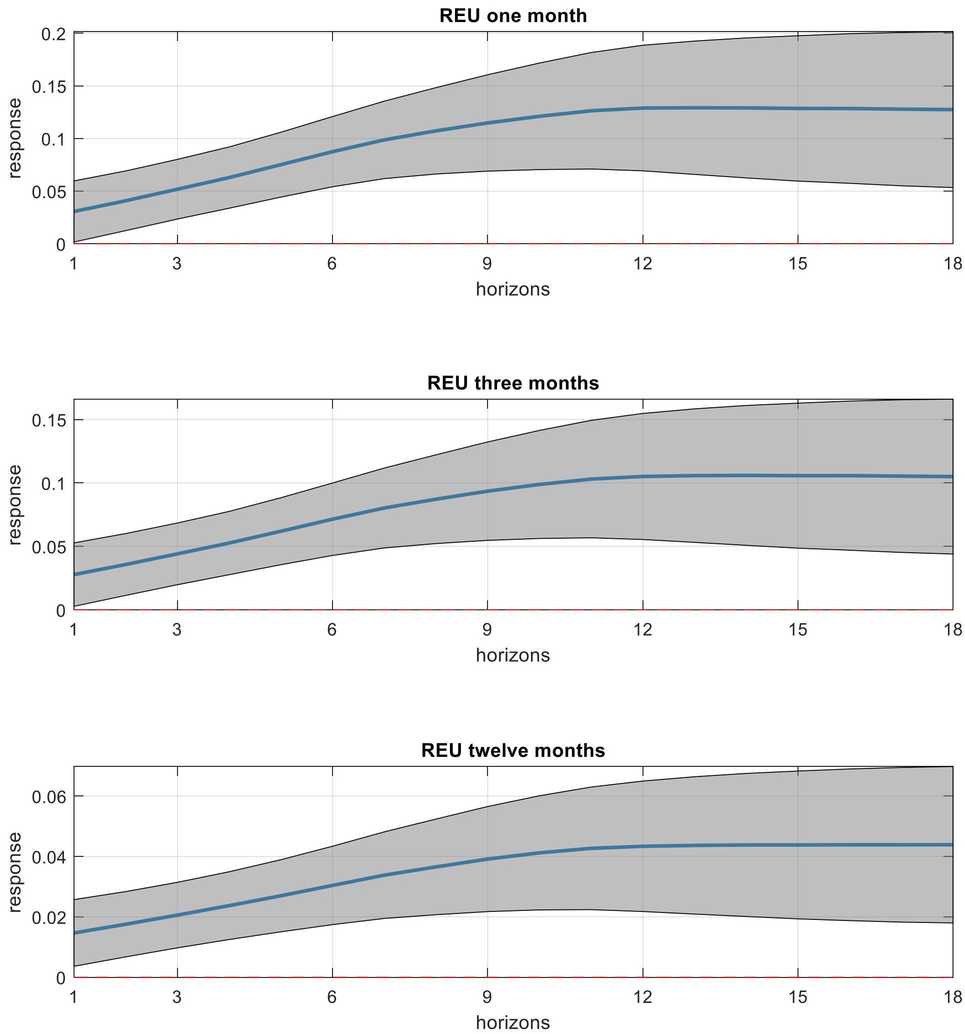

Figure 12: Responses to Monetary Policy Surprises (alternatives REU: sign-based)

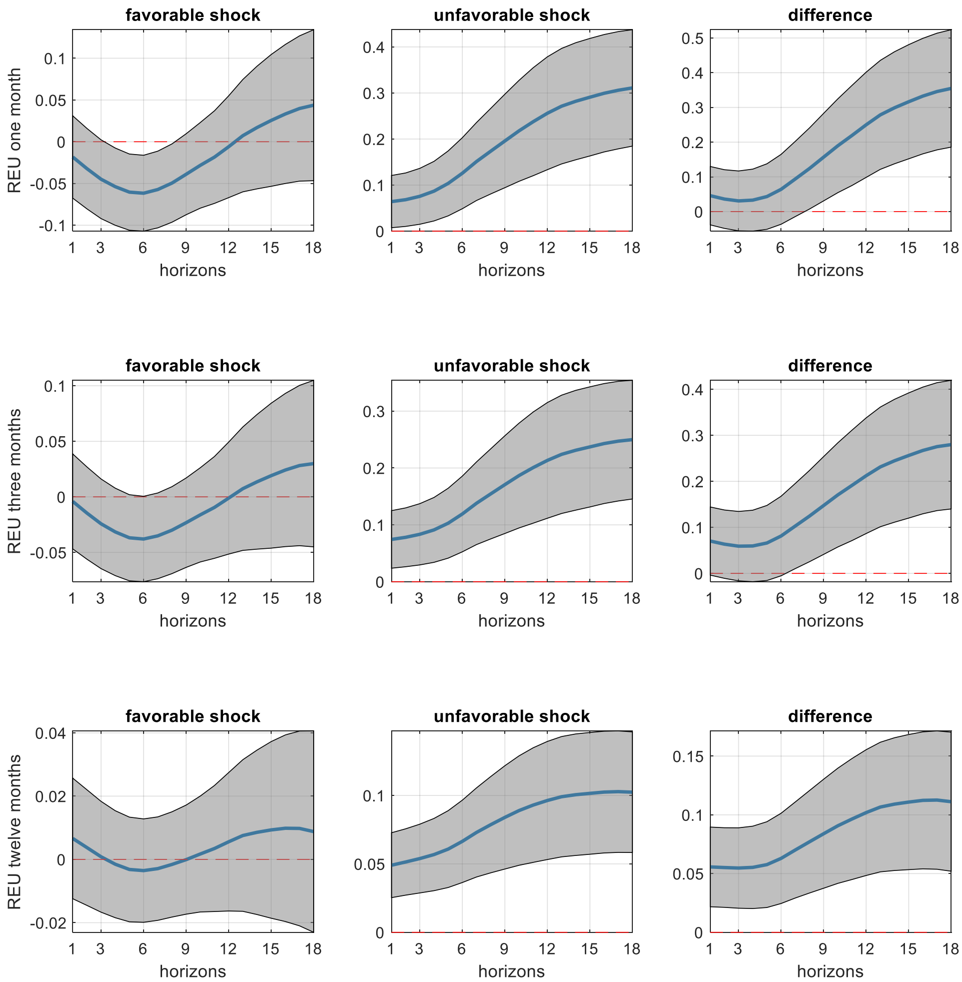

Figure 13: Responses to Financial Shocks (alternative REU: linear)

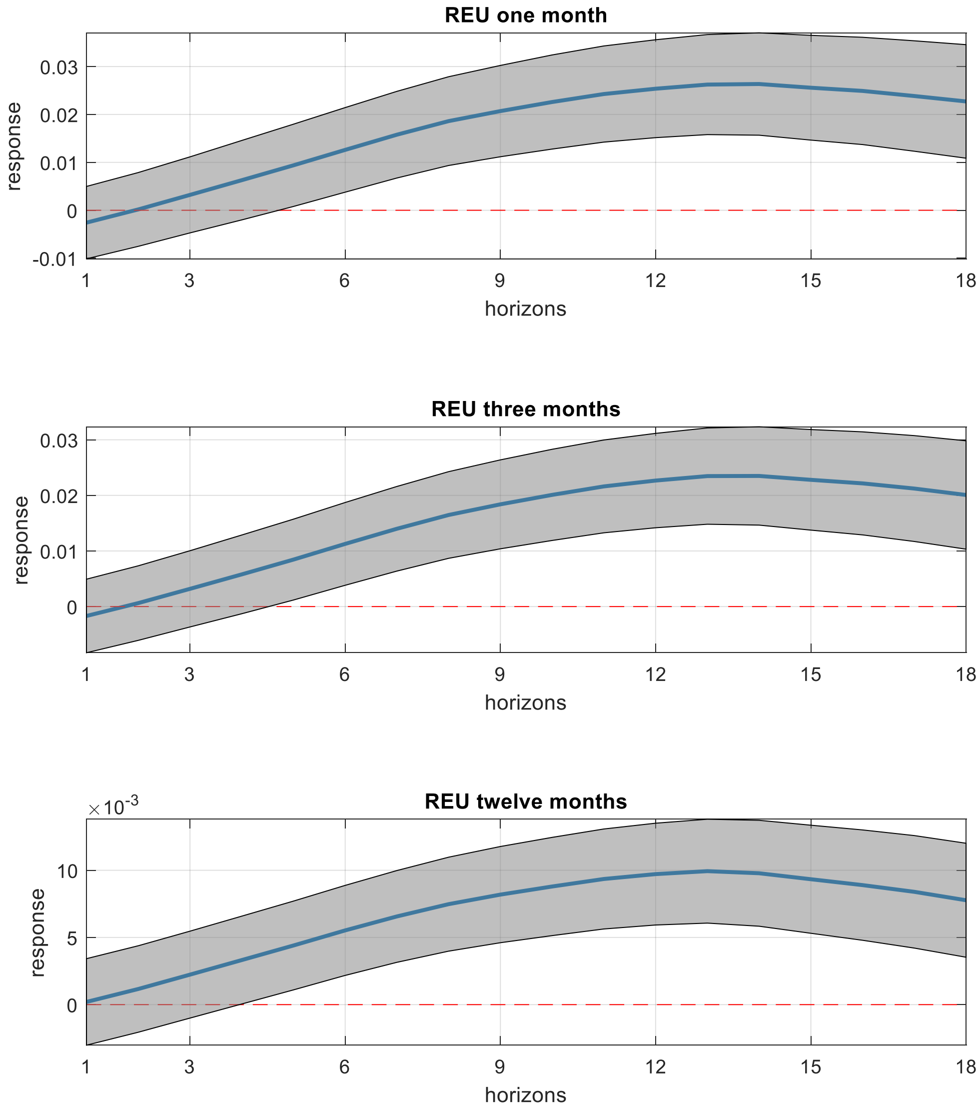

Figure 14: Responses to Financial Shocks (alternative REU: sign-based)

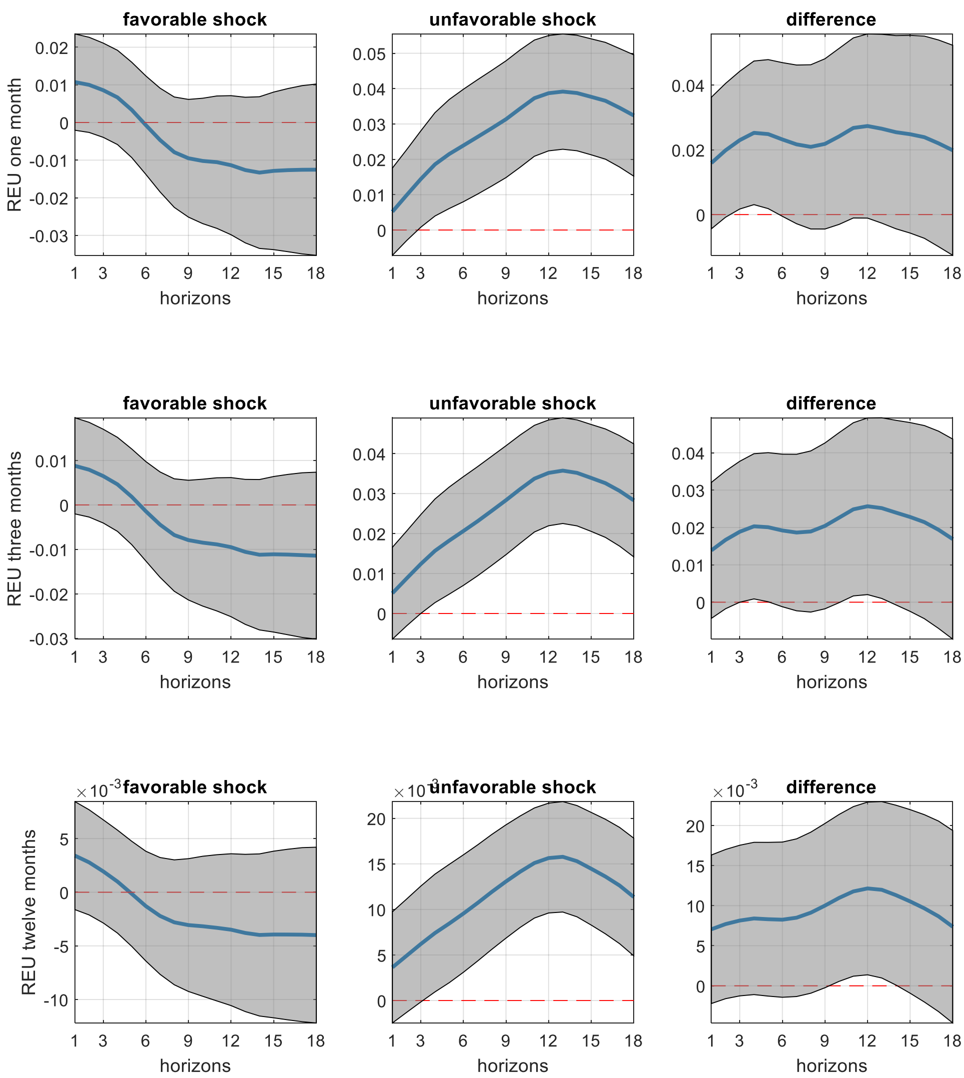

Figure 15: Responses to Alternative Surprises (Bauer raw: linear)

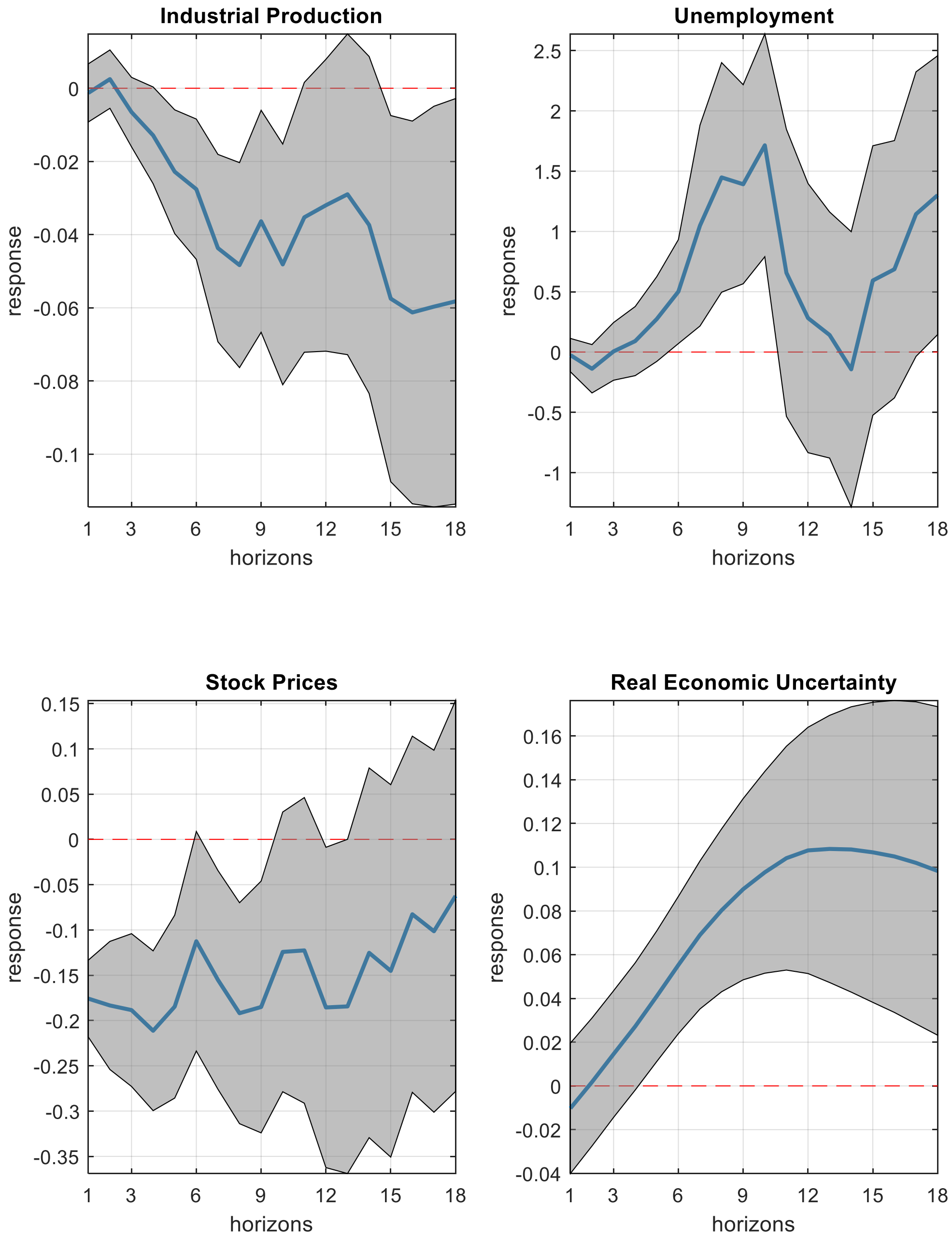

Figure 16: Responses to Alternative Surprises (Bauer raw: sign-based)

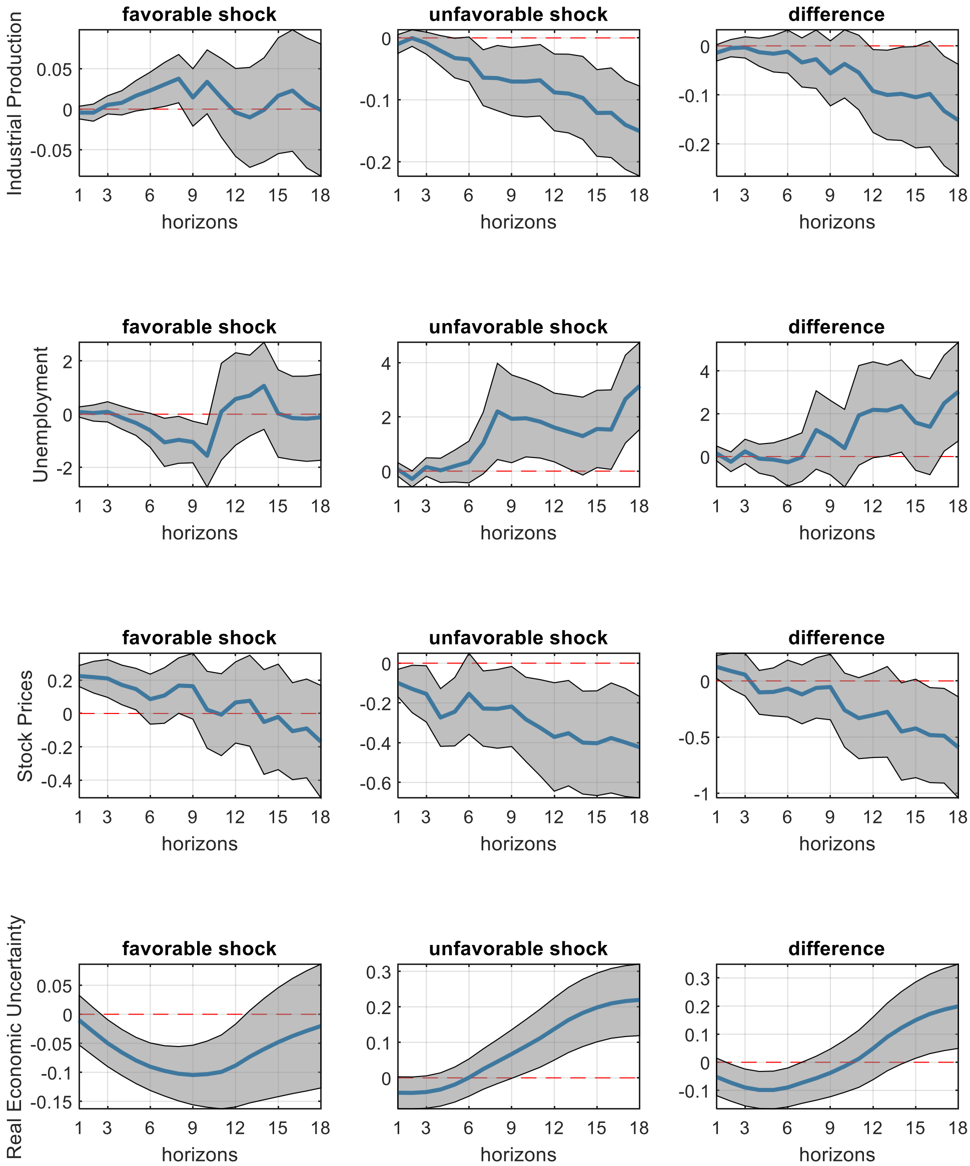

Figure 17: Responses to Alternative Surprises (Jarocinski: linear)

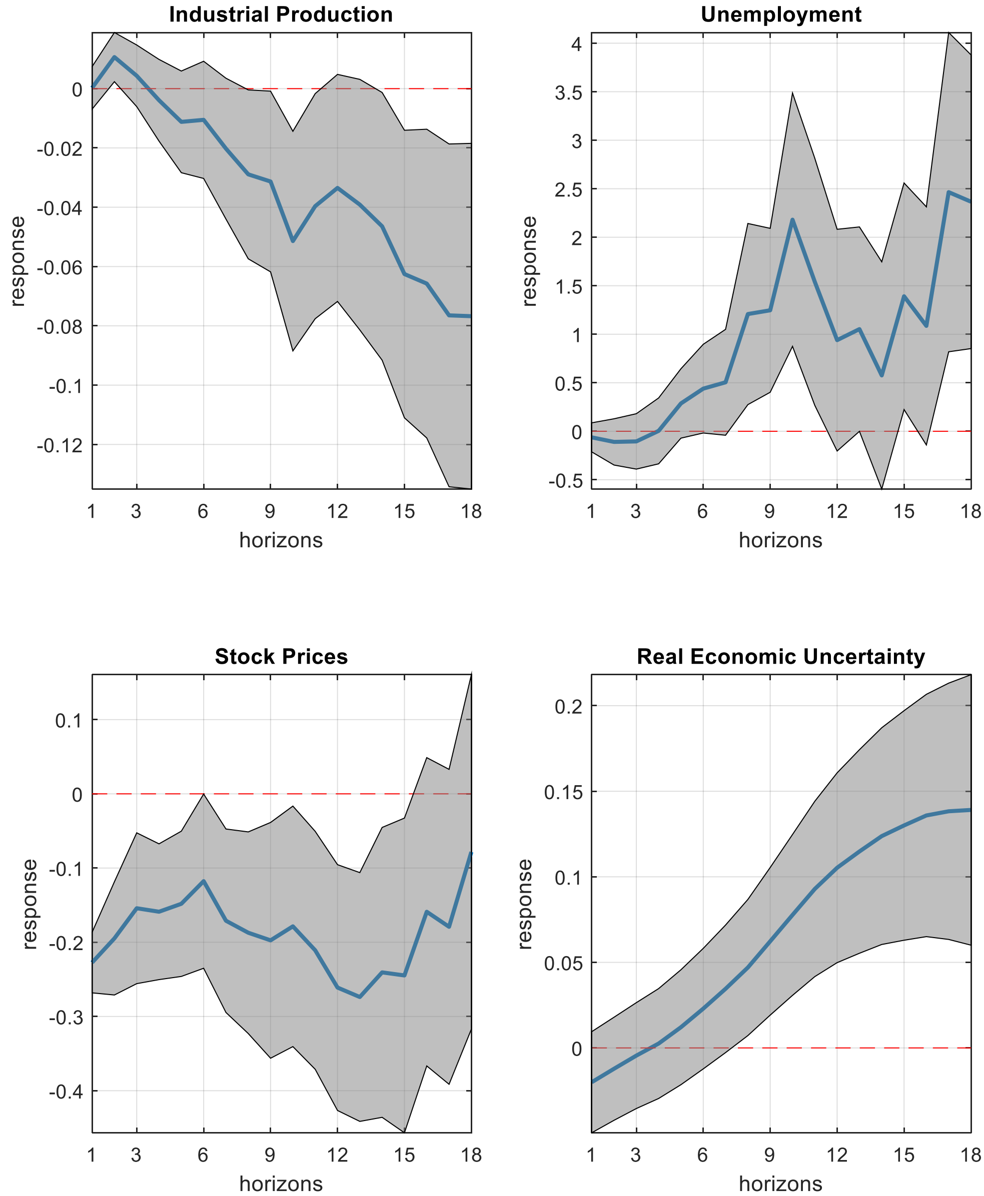

Figure 18: Responses to Alternative Surprises (Jarocinski: sign-based)

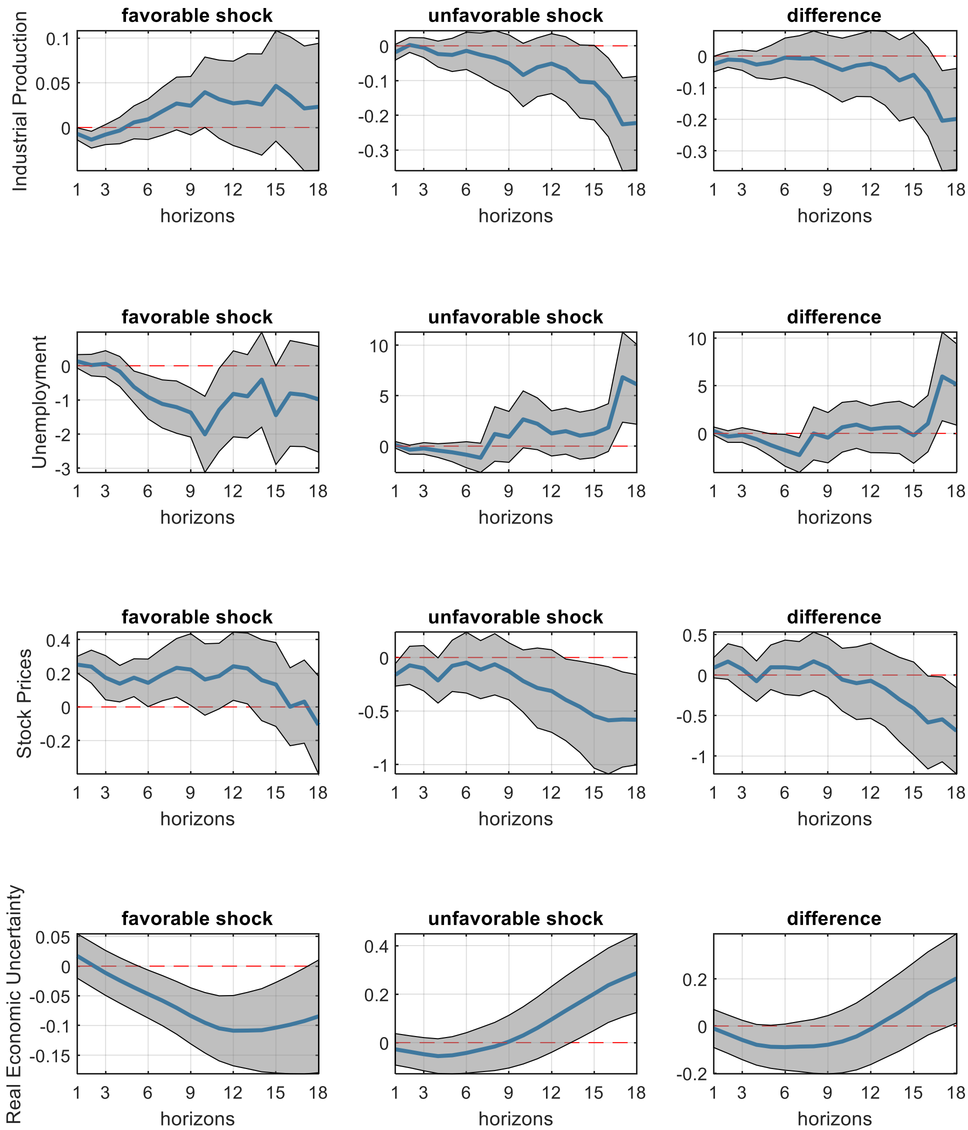

Figure 19: Responses to Alternative Financial Shocks

(NFCI: linear)

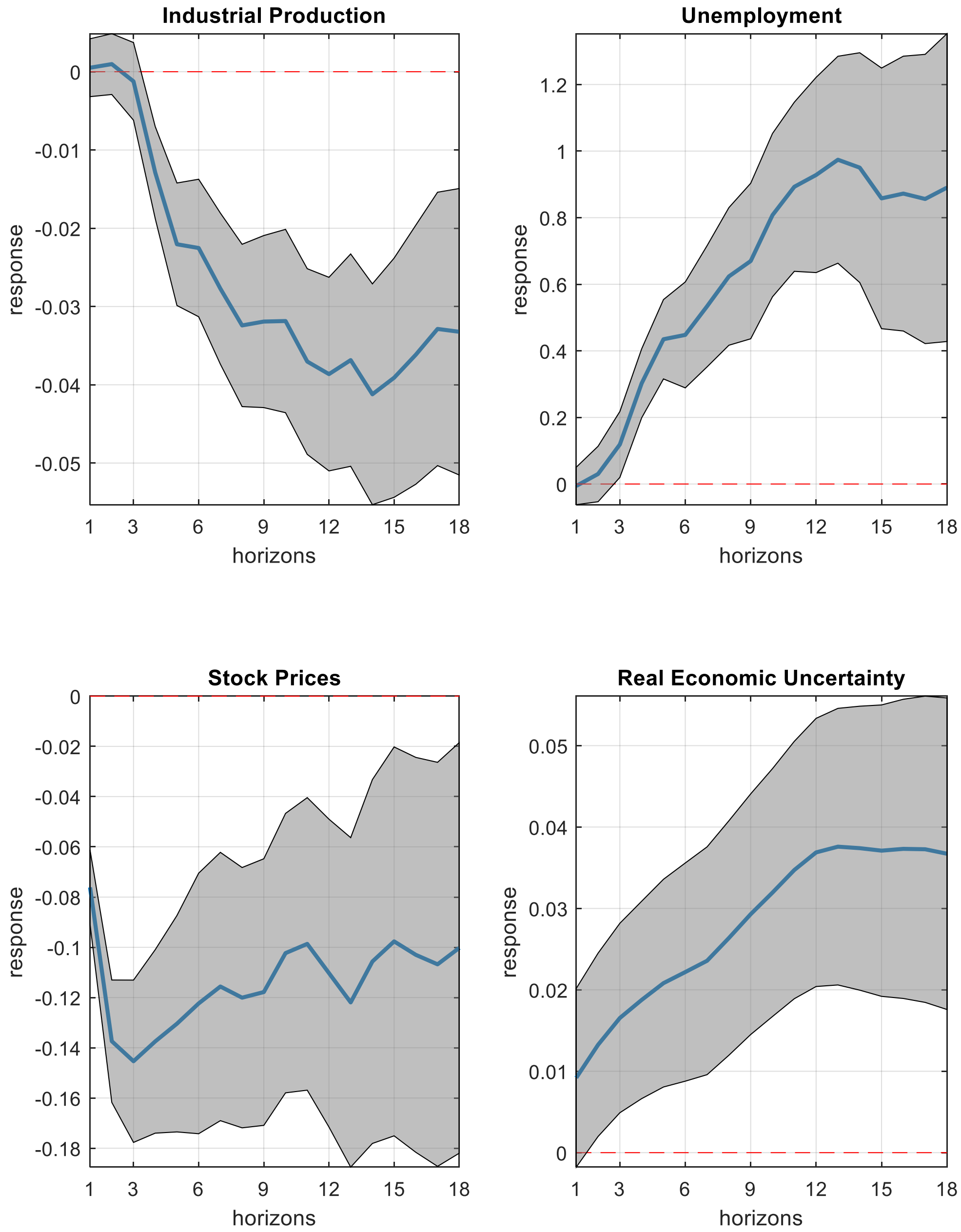

Figure 20: Responses to Alternative Financial Shocks

(NFCI: sign-based)

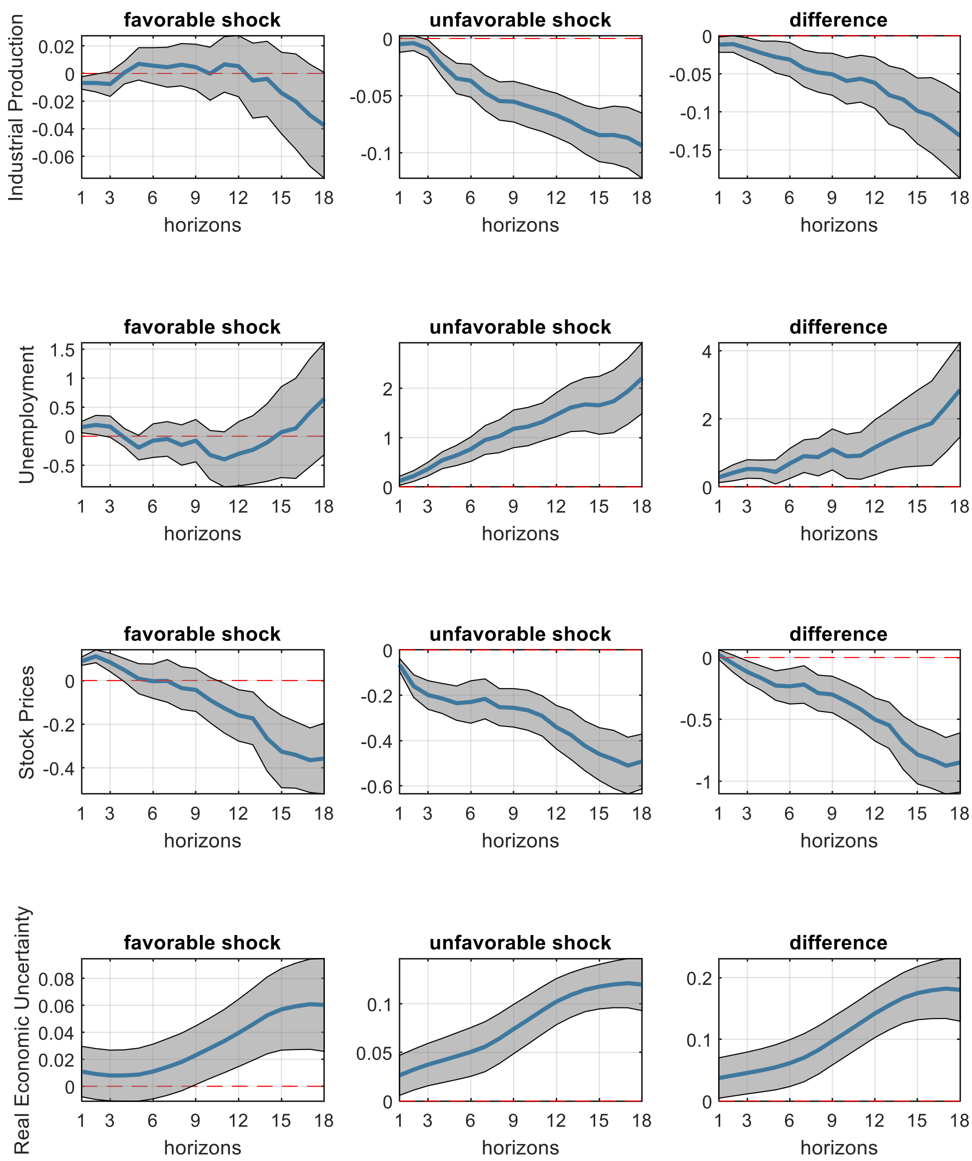

Figure 21: Responses to Alternative Financial Shocks

(FCIG3: linear)

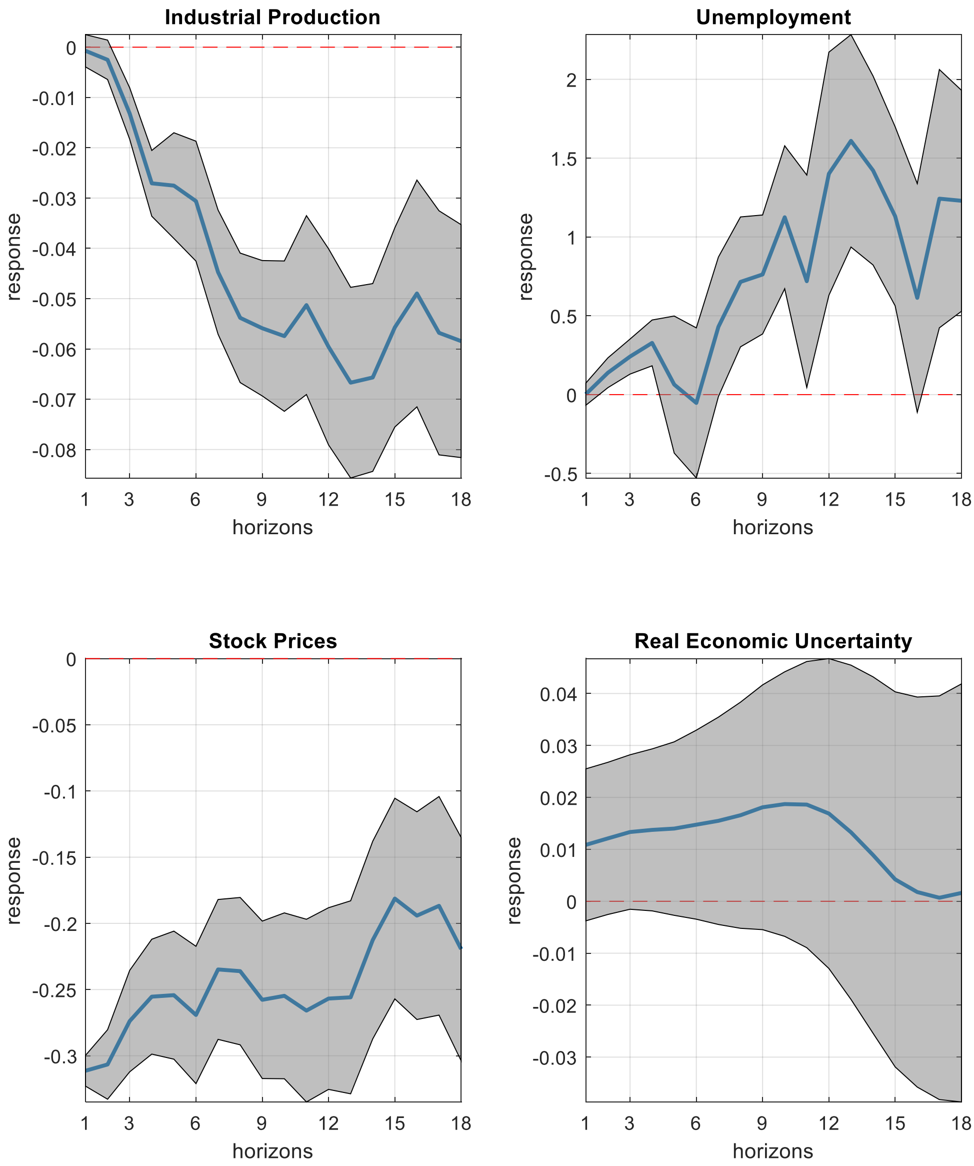

Figure 22: Responses to Alternative Financial Shocks

(FCIG3: sign-based)