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THE INTERNATIONAL DIMENSION OF CONFIDENCE SHOCKS

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In 2014 all ECB publications feature a motif taken from the €20 banknote.

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Abstract

Building on Beaudry, Nam and Wang (2011) – hereafter BNW –, we use survey data on consumer sentiment in order to identify the causal effects of confidence shocks on real economic activity in a selection of advanced economies. Starting from a set of closed-economy VAR models, we show that these shocks have a significant and persistent impact on domestic consumption and real GDP. In line with BNW, we find that confidence shocks explain a large share of the variance in real economic activity. At the same time, the shocks we identify are significantly correlated across countries. In order to account for common global components in international confidence cycles, we extend the analysis to a FAVAR model. This approach proves effective in removing the correlation in country-specific confidence shocks and in isolating mutually orthogonal idiosyncratic components. As a result, the (domestic and cross-border) impacts of country-specific confidence shocks are smaller and their contribution to business cycle fluctuations is reduced, confirming the global dimension of confidence shocks. Overall, our evidence shows that confidence shocks play some role in business cycle fluctuations. At the same time, we show that confidence shocks have a strong global component, supporting their role in international business cycles.

Keywords: Consumer Confidence, Consumption, International Linkages, Vector Autoregression (VAR), Factor-Augmented VAR (FAVAR).

JEL Classification : C32, E17, E32, F41.

NON-TECHNICAL SUMMARY

Economic theory has long ago claimed that waves of optimism and pessimism could be important drivers of business cycles. Survey data on consumer sentiment might provide information about such optimistic or pessimistic views regarding future economic developments, in particular regarding uncertainty that may have substantial implications for real economic activity. The global financial crisis, which started as a sub-prime debt crisis in the U.S. and has subsequently undergone a number of different stages (e.g. the bankruptcy of Lehman Brothers or the euro area sovereign debt crisis), has been repeatedly qualified as a "confidence crisis". The global nature of this crisis has highlighted the importance of the international dimension of confidence shocks.

There are two contrasting approaches to the role of confidence in macroeconomics: the "information" or "news" view, which suggests that confidence indicators contain information about future economic developments, and the "animal spirits" view, which claims that changes in beliefs which are unrelated to economic fundamentals have a causal effect on the business cycle. To this day, the conclusions in the related academic research remain ambiguous. At one extreme, confidence measures are shown to have both predictive power for and a role in understanding business cycle fluctuations. At the other extreme, some researchers conclude that the concept of confidence does not play any valuable role in macroeconomics.

First, this paper aims at identifying confidence shocks in a vector autoregression (VAR) model and assesses the impact of such shocks on macroeconomic developments. While most related research has so far been conducted on U.S. data, we extend previous analyses on the macroeconomic impacts of confidence shocks to a number of economies. In addition to the United States, we also focus on the euro area as a whole as well as Germany, France and Italy, taken individually, and the United Kingdom. Our VAR models include survey indicators of consumer confidence, as such measures might reflect supplementary information that private consumers have or believe to have about future economic developments. We think that survey measures of consumer confidence are (i) more timely than changes in actual real private household consumption and (ii) more adequate than stock prices in order to account for broad swings in consumer sentiment.

Second, we use an international factor-augmented VAR (FAVAR) model to account for common global components in the countries' confidence cycle. Due to data limitations, the sample used to estimate all VAR and FAVAR models includes quarterly observations from 1985Q1 to 2011Q4.

The analysis of impulse response functions reveals that confidence shocks have qualitatively similar effects for all countries in our sample: consumption increases on impact and remains significantly higher in the long term, in most countries. Real interest rates rise on impact, converging back to their steady-state values within a relatively short time span. Real GDP hardly responds on impact but tends to be higher persistently in most countries. We find that confidence shocks explain a large share of the variance in real output growth. Interestingly, the confidence shocks we identify feature large contemporaneous correlations across countries.

In order to remove these common global components in the confidence cycle, we extend the previous analysis to an international factor-augmented VAR (FAVAR) model, which introduces so-called factors, i.e. common components that are prevalent in all other and possibly third countries, in the benchmark VAR. With this methodology, we aim at analysing the global dimension of confidence shocks in order to assess their domestic and cross-border effects. Moreover, our results provide empirical evidence for theoretical models of news-driven international business cycles.

This approach proves effective in removing the correlation in country-specific confidence shocks, thus isolating their idiosyncratic components. As a result, the impact of country-specific confidence shocks on real GDP and consumption becomes smaller and less persistent. The fact that the impulse response functions are attenuated indicates that a noticeable share of the confidence shocks identified in a closed-economy VAR model must be attributed to common global components. Moreover, the transmission of a confidence shock to other countries is, in most cases, significant in the short run for foreign consumer confidence, but not for consumption and real GDP. This result supports the idea of a confidence channel in the international transmission of shocks. Finally, the contribution of country-specific confidence shocks to business cycle fluctuations is also reduced, confirming the global dimension of confidence shocks.

Overall, our analysis provides robust evidence that confidence shocks play some role in business cycle fluctuations. At the same time, we show that confidence shocks have a strong global component, supporting their relevance in the international business cycle.

1 Introduction

Economic theory has long ago claimed that waves of optimism and pessimism could be important drivers of business cycles (see, e.g., Pigou, 1927). Survey data on consumer sentiment might provide information about such optimistic or pessimistic views regarding future economic developments, in particular regarding uncertainty that may have substantial implications for real economic activity. The global financial crisis, which started as a sub-prime debt crisis in the U.S. and has subsequently undergone a number of different stages (e.g. the bankruptcy of Lehman Brothers or the euro area sovereign debt crisis) has been repeatedly qualified as a "confidence crisis"[1]. The global nature of this crisis has highlighted the importance of the international dimension of confidence shocks.

As summarised in Barsky and Sims (2012), there are two contrasting approaches to the role of confidence in macroeconomics: the "information" or "news" view, which suggests that confidence indicators contain information about future economic developments (see, e.g., Beaudry and Portier, 2006; Jaimovich and Rebelo, 2009; Barsky and Sims, 2011), and the "animal spirits" view, which claims that changes in beliefs which are unrelated to economic fundamentals have a causal effect on the business cycle, as in Angeletos and La'O (2013). To this day, the conclusions in the related empirical research remain ambiguous. At one extreme, confidence measures are shown to have both predictive power for and a role in understanding business cycle fluctuations (see, e.g., Carroll, Fuhrer, and Wilcox, 1994; Ludvigson, 2004). At the other extreme, some researchers conclude that the concept of confidence does not play any valuable role in macroeconomics (e.g. Barsky and Sims, 2011).

First, this paper aims at identifying confidence shocks in a vector autoregression (VAR) model and assesses the impact of such shocks on macroeconomic developments. Following Beaudry, Nam and Wang (2011) – hereafter BNW –, we extend previous analyses on the macroeconomic impacts of confidence shocks to a number of economies. In addition to the United States, which was analysed already in BNW and Barsky and Sims (2012), we also focus on the euro area as a whole as well as Germany, France and Italy, taken individually, and the United Kingdom. Due to data limitations, the sample used to estimate all VAR models includes quarterly observations from 1985Q1 to 2011Q4.

The identification scheme relies on the penalty function approach for sign restrictions proposed by Uhlig (2005) and Mountford and Uhlig (2009) and employed, for example, in BNW. Our VAR models comprise widely-used macroeconomic variables, such as real private consumption, real GDP, real interest rates and unemployment. Moreover, we include survey indicators of consumer confidence, based on the notion that innovations in these measures might reflect supplementary information that private consumers have or believe to have about future economic developments. We think that survey measures of consumer confidence are (i) more timely than changes in actual real

[1]In her speech "The Challenges for the Global Economy", Christine Lagarde, the managing director of the IMF, said in 2011 that "the world is collectively suffering from a crisis of confidence" (Opening remarks at the Royal Institute for International Affairs – Chatham House, London, 9 September 2011, http://www.imf.org/external/np/speeches/2011/090911.htm).

private household consumption[2] and (ii) more adequate than stock prices in accounting for broad swings in consumer sentiment. While consumer surveys are supposed to be representative for the entire population, the generalisability of share prices as a measure of optimism or pessimism hinges on the assumption that selection into stock market participation is uncorrelated with sentiments. In order for this to hold, in general, participation in the stock market would have to be complete. Although one can make a point that stock ownership is widespread in the U.S. and the UK, this is not the case for the other countries in our sample and the euro area as a whole.

Importantly, our identifying approach is agnostic with regard to the "information" and "animal spirits" interpretation of consumer confidence. Accordingly, the confidence shocks we identify might represent a conglomerate of different influences, including, e.g., (expected) changes in fiscal policy or idiosyncratic mood swings. As a consequence, our confidence shocks could function both as a *channel* and as an independent *driver* of business cycle fluctuations.

The analysis of impulse response functions reveals that confidence shocks have qualitatively similar effects for all countries in our sample: consumption increases on impact and remains significantly higher in the long term, in most countries. Real interest rates rise on impact, converging back to their steady-state values within a relatively short time span. Real GDP hardly responds on impact but tends to be higher persistently in most countries. As in BNW, we find that confidence shocks explain a large share of the variance in real output growth. Interestingly, the confidence shocks we identify feature large contemporaneous correlations across countries.

In order to remove these common global components in the confidence cycle, we extend the previous analysis to an international factor-augmented VAR (FAVAR) model, which introduces so-called factors, i.e. common components that are prevalent in all other and possibly third countries, in the benchmark VAR model. With this methodology, we aim at analysing the global dimension of confidence shocks in order to assess their domestic and cross-border effects. Moreover, our results provide empirical evidence for theoretical models of news-driven international business cycles, such as the one proposed by Beaudry, Dupaigne and Portier (2011).

This approach proves effective in removing the correlation in country-specific confidence shocks, thus isolating the idiosyncratic components. As a result, the impact of country-specific confidence shocks on real GDP and consumption becomes smaller and less persistent. The fact that the impulse response functions are attenuated indicates that a noticeable share of the confidence shocks identified in a closed-economy VAR must be attributed to common global components. Moreover, the transmission of a confidence shock to other countries is, in most cases, significant in the short run for foreign consumer confidence, but not for consumption and real GDP. This result supports the idea of a confidence channel in the international transmission of shocks. Finally, the contribution of country-specific confidence shocks to business cycle fluctuations is also reduced, confirming the global dimension of confidence shocks. Several robustness checks with regard to the number of endogenous variables, the identification scheme, or the variable used to capture "confidence" (i.e.

[2] Although the survey is conducted on a monthly basis both in the U.S. and the European Union, the quarterly availability of real GDP and real private household consumption restricts our VAR analysis to quarterly frequency.

survey data on consumer sentiment vs. stock market indices) do not invalidate these findings.

Overall, our analysis provides robust evidence that confidence shocks play some role in business cycle fluctuations. At the same time, we show that confidence shocks have a strong global component, supporting their relevance in international business cycles.

The plan of the paper is as follows: Section 2 presents the benchmark VAR model and the country-specific effects of confidence shocks. Section 3 compares these results with those based on a FAVAR approach. The FAVAR model also allows us to study the international transmission of each country-specific confidence shock. Section 4 provides a number of robustness checks. Section 5 concludes.

2 The Benchmark VAR Model

We start our analysis of the role of confidence shocks in business cycles by estimating simple closed-economy VAR models (similar to those estimated in BNW) for a number of countries. The empirical evidence confirms the role of confidence shocks in explaining economic fluctuations in the short term. The results also show that the confidence shocks we identify are correlated across countries, confirming the global dimension of this type of shocks.

2.1 VAR specification

The benchmark is a country-specific VAR model in the (5×1) vector $\mathbf{y}_{i,t} = (conf_{i,t}, cons_{i,t}, intr_{i,t}, unem_{i,t}, gdp_{i,t})'$, where $conf_{i,t}$ denotes the value of a seasonally adjusted survey measure of consumer confidence, $cons_{i,t}$ denotes real private household consumption, $intr_{i,t}$ is an inflation-adjusted measure of short-term interest rates, $unem_{i,t}$ is the unemployment rate, and $gdp_{i,t}$ denotes real domestic GDP of country i in period t, respectively. We use realised rather than expected inflation to deflate nominal interest rates. Accordingly, $intr_{i,t}$ should be interpreted as an ex-post measure of real short-term interest rates.

For the sake of comparability, the measures of consumer confidence are standardised to have zero mean and unit variance. All data are quarterly. Interest and unemployment rates are in levels (%), while household consumption and GDP are in log differences. Thus, we explicitly account for the presence of a unit root in the latter variables.

Note that the specification of consumption and GDP in log differences rather than log levels deviates from BNW. Our motivation for differencing these variables is that the FAVAR model underlying the later analysis relies on the assumption that all variables are stationary. The issue of unit roots in dynamic factor models is yet unsolved and beyond the scope of this paper. For consistency and comparability of results, we hence differentiate consumption and GDP, which are most likely integrated of order one. Given that we impose sign restrictions on the impact period only, restricting the impulse response of the growth rate of consumption to be positive is qualitatively equivalent to restricting the level of consumption to be positive.[3],

We are interested in estimating the following structural VAR(p) model for each country i:

$$\mathbf{A}_{i,0}\mathbf{y}_{i,t} = \alpha_i + \mathbf{A}_{i,1}\mathbf{y}_{i,t-1} + \ldots + \mathbf{A}_{i,p}\mathbf{y}_{i,t-p} + \varepsilon_{i,t}, \tag{1}$$

where $\varepsilon_{i,t}$ represents the vector of orthogonal structural innovations. We impose the normalisation $E\left[\varepsilon_{i,t}\varepsilon'_{i,t}\right] = I_{(5\times5)}$. Conditional on $\mathbf{A}_{i,0}$ being invertible, the reduced-form representation of (1) is given by

$$\begin{aligned}\mathbf{y}_{i,t} &= \underbrace{\mathbf{A}_{i,0}^{-1}\alpha_i}_{} + \underbrace{\mathbf{A}_{i,0}^{-1}\mathbf{A}_{i,1}\mathbf{y}_{i,t-1}}_{} + \ldots + \underbrace{\mathbf{A}_{i,0}^{-1}\mathbf{A}_{i,p}\mathbf{y}_{i,t-p}}_{} + \underbrace{\mathbf{A}_{i,0}^{-1}\varepsilon_{i,t}}_{} \\ &= \beta_i + \mathbf{B}_{i,1}\mathbf{y}_{i,t-1} + \ldots + \mathbf{B}_{i,p}\mathbf{y}_{i,t-p} + \mathbf{e}_{i,t},\end{aligned} \tag{2}$$

where $\mathbf{e}_{i,t}$ denotes a vector of possibly contemporaneously correlated innovations, while β_i and $\mathbf{B}_{i,l}$, $l = 1, \ldots, p$, are the intercept and slope coefficients of the reduced-form VAR. Straightforward estimation of (2) by multivariate least squares yields a consistent estimate of the coefficient matrix $\hat{\mathbf{B}}_i \equiv \left[\hat{\beta}_i \; \hat{\mathbf{B}}_{i,1} \ldots \hat{\mathbf{B}}_{i,p}\right]$ and the reduced-form disturbances $\hat{\mathbf{e}}_{i,t}$ for country i. Throughout this paper, we assume a lag order of $p = 2$ quarters.[4]

We are interested in the domestic effects of consumer confidence shocks and their contribution to business cycle fluctuations in a multi-country setting. Therefore, we estimate this VAR model for various advanced economies: the U.S., the United Kingdom (UK), France (FR), Germany (DE), Italy (IT), and the euro area (EA). We first estimate six country-specific VAR models based on quarterly data for the variables in $y_{i,t}$. For each $i \in \{US, UK, FR, DE, IT, EA\}$, the vector $y_{i,t}$ comprises observations of domestic consumer confidence, real private household consumption[5], the real short-term interest rate, the unemployment rate, and real GDP from 1985Q1 to 2011Q4. The original sources and transformations of these time series are described in detail in Appendix A.

2.2 Identification

We are not interested in the reduced-form estimates, but in the parameters of the structural VAR in (1) and, in particular, the structural confidence shock. Note that this requires identifying the inverse matrices of contemporaneous coefficients, $\mathbf{A}_{i,0}^{-1}$, where $\mathbf{A}_{i,0}^{-1}\left(\mathbf{A}_{i,0}^{-1}\right)' = \mathbf{\Sigma}_{i,e} \equiv E\left[\hat{\mathbf{e}}_{i,t}\hat{\mathbf{e}}'_{i,t}\right]$.

[3] We have also estimated the country-specific VAR model with consumption and GDP in log levels. The resulting impulse response functions are qualitatively very similar to those for consumption and GDP in log differences and available upon request.

[4] We consider two criteria for lag order selection. While the Schwartz Information Criterion (SIC) consistently suggests an optimal lag length of 1, the Akaike Information Criterion (AIC) varies strongly between different countries, ranging from 1 to 6. Our empirical results are generally robust to increasing the lag order to $p = 4$. Of course, this comes at the cost of less precise parameter estimates and wider confidence bands of the impulse response functions.

[5] Note also that BNW express U.S. household consumption in per capita terms. Since quarterly population data going back to 1985Q1 is not available for all countries in our sample, we cannot replicate the per-capita transformation.

Moreover, $\mathbf{A}_{i,0}^{-1}$ can equivalently be written as

$$\mathbf{A}_{i,0}^{-1} = \mathbf{\Lambda}_{i,0} Q_i,$$

where $\mathbf{\Lambda}_{i,0}$ denotes an arbitrary orthogonal decomposition of $\mathbf{\Sigma}_{i,e}$ and Q_i is an orthonormal (5×5) matrix.

Suppose we use the Cholesky decomposition of $\hat{\mathbf{\Sigma}}_{i,e}$ to obtain a sample estimate of $\mathbf{\Lambda}_{i,0}$. Since we are interested in the effects of a single structural shock, it is sufficient to determine a (5×1) unit vector q_i of the matrix Q_i, which we recover by imposing sign restrictions on the impulse responses of a set of variables using the *penalty function approach* proposed in Uhlig (2005) and applied, e.g., in Mountford and Uhlig (2009). We can then obtain the corresponding impulse vector $\mathbf{a}_i$, which is a column of the matrix $\mathbf{A}_{i,0}^{-1}$, as $\mathbf{a}_i = \mathbf{\Lambda}_{i,0} q_i$.

The basic idea of sign restrictions is to identify a certain structural shock by comparing the impulse response functions implied by a randomly drawn impulse vector with a set of previously specified qualitative constraints for horizons $r = 0, \ldots, R-1$. Draws which violate any of the sign restrictions are then discarded, while the rest is kept as admissible solutions. This strategy implies that the vector q_i will only be set identified, i.e., there is *no unique* model that satisfies all sign restrictions.[6]

Instead, the penalty function approach determines a single impulse vector $\mathbf{a}_i^* = \mathbf{\Lambda}_{i,0} q_i^*$ which satisfies a given set of sign restrictions *as much as possible*. Let $C_{k,\mathbf{a}_i}(r)$ denote the response of variable k to the impulse vector $\mathbf{a}_i$ at horizon r. Following Uhlig (2005) and BNW, we recover q_i^* by solving the following minimisation problem:

$$q_i^* = \arg\min_{q_i} \mathbf{\Psi}(q_i) \quad s.t. \quad q_i' q_i = 1, \tag{3}$$

where the criterion function $\mathbf{\Psi}(q_i)$ is given by

$$\mathbf{\Psi}(q_i) = \sum_k \sum_{r=0}^{R-1} f\left(\iota_k \frac{C_{k,\mathbf{a}_i}(r)}{\sigma_k}\right). \tag{4}$$

In (4), $\iota_k = -1$ if variable k is supposed to increase in response to the shock and $\iota_k = 1$ if variable k is supposed to decrease. As in Uhlig (2005), we use a penalty function f that penalises violations of sign restrictions much more than it "rewards" compliance, i.e., $f(x) = 100x$ if $x \geq 0$ and $f(x) = x$ if $x < 0$.[7] The impulse responses in (4) are scaled by the corresponding standard deviation in order to make them comparable across variables.

Throughout this paper, we impose sign restrictions on the same set of variables as in BNW: In response to a wave of optimism in country i, domestic consumer confidence, (the growth rate

[6] Fry and Pagan (2007, 2011) discuss some of the issues arising from identification by sign restrictions.

[7] The reward component is necessary in order to always identify *exactly one* best impulse vector. Otherwise, all q_i which satisfy the set of sign restrictions have a penalty function value of zero (compare Uhlig, 2005).

of) real private consumption, and the real interest rate should *not decrease* for at least one period, i.e., $R = 1$, $k \in \{conf_i, cons_i, intr_i\}$, and $\iota_k = -1\ \forall k$. The former two restrictions are most intimately linked to a positive consumer confidence shock, while the nonnegative response of interest rates helps to exclude the possibility of an *exogenous* expansionary monetary policy shock. In all specifications, we impose sign restrictions for the impact period only. Note that our empirical results are qualitatively robust to extending them to longer horizons, e.g. $R = 4$.

In their benchmark model, BNW include Basu et al.'s (2006) utilisation-adjusted measure of U.S. total factor productivity (TFP) and impose a zero restriction on the impact response of this variable along with the sign restrictions discussed above. Due to the lack of a corresponding measure of TFP for the other countries in our sample, we cannot make use of this additional restriction. However, Figure B.1 in Appendix B replicates the results for the five-variable model in BNW and illustrates that the impulse response functions of the other variables are not significantly affected by dropping the zero impact restriction on adjusted TFP or dropping adjusted TFP from the VAR altogether, i.e. estimating a four-variable model in U.S. stock prices, consumption, real interest rates, and hours, and identifying confidence shocks only by imposing sign restrictions on the impact responses of the first three variables. As a consequence, we are confident that our identification strategy is robust even without a measure of (utilization-adjusted) TFP at hand.[8]

As in Uhlig (2005), we take a Bayesian approach to inference. We draw 500 times from a Normal-Wishart posterior distribution that is parameterised by the sample estimates of the coefficient matrix, $\mathbf{B}_i$, and the covariance matrix of reduced-form error terms, $\mathbf{\Sigma}_{i,e}$. For each draw d, the criterion function in (4) is minimised in order to determine a single best impulse vector $\mathbf{a}^*_{i,d}$ and compute impulse response functions.

To avoid the critique in Fry and Pagan (2007), we do not evaluate point-wise medians based on different structural models. Instead, our point estimates of impulse response functions correspond to the impulse vector $\mathbf{a}_{i,0}$ which minimise the criterion function for country i conditional on data from 1985Q1 to 2011Q4. The black lines and shaded areas indicate point-wise 16th and 84th percentiles of each impulse response function based on 500 draws from the posterior.

The benchmark model suffers from two critical shortcomings. First, the closed-economy VAR cannot be used to investigate the international transmission of confidence shocks. Second, the supposedly structural disturbances identified from separate country models are not truly country-specific or idiosyncratic. Nonzero contemporaneous correlations might arise from a common global component in confidence shocks or from an immediate transmission of shocks between economies, as we will illustrate shortly.

[8]In subsection 4.3, we also verify that the results do not change when a measure of the consumer price level is added to our benchmark VAR model and sign restrictions are imposed on its impact response in order to exclude confounding supply shocks.

2.3 Empirical results

This section analyses the empirical relevance of structural confidence shocks identified based on the benchmark VAR model in (1). All results are for data from 1985Q1 to 2011Q4. Statistical inference is based on a Bayesian approach as in Uhlig (2005) and BNW. As a starting point, we present the impulse response functions of all five variables to a domestic confidence shock and illustrate that the responses are statistically significantly different from zero. We then compute the corresponding forecast error variance decompositions (FEVD) to assess the role of confidence shocks in the fluctuations of these variables. Finally, we show that the identified confidence shocks are highly correlated across countries, indicating an important global dimension.

2.3.1 Impulse response analysis

Figures 1 to 5 illustrate the impulse response functions of domestic variables to a typical positive confidence shock in five individual countries and the euro area. Each plot depicts the point estimate of the response together with pointwise 16th and 84th percentiles based on 500 draws from the corresponding Normal-Wishart posterior distribution of the reduced-form parameters. Responses are plotted for up to 40 quarters following the shock. Note that the impulse response functions of consumer confidence are expressed in terms of standard deviations, while those of consumption and real GDP correspond to the cumulated responses of the variables in log differences. Accordingly, the latter can be interpreted as level responses in percent.

In line with the imposed sign restrictions, consumer confidence, real private consumption, and short-term real interest rates increase on impact. The penalty function approach implies that the response of these three variables is "as positive as possible" for $R = 1$ periods, whereas we do not impose any restriction on the unemployment rate or real GDP. Interestingly, the real interest rate and our measure of consumer confidence peak on impact and within one year, respectively, while consumption continues to expand for more than ten quarters in case of the U.S. and the UK.

[Figure 1 here]
[Figure 2 here]
[Figure 3 here]
[Figure 4 here]
[Figure 5 here]

The unemployment rate barely responds on impact, but displays a highly significant decrease by up to 40 basis points in case of the U.S. and the UK over the next three years. While quantitatively less striking, the reduction in European unemployment rates is qualitatively very similar. Only the Italian unemployment rate seems to overshoot significantly about four years after the shock for $R = 1$.[9] The impulse responses of real GDP to a domestic confidence shock are hump-shaped, in

[9]The overshooting of the unemployment rate in case of IT disappears and the impulse response functions for the other euro area economies and the euro area as a whole become quantitatively more pronounced if sign restrictions are imposed for more than just the impact period, e.g. for $R = 4$.

all cases. Moreover, those for the U.S. and the UK quantitatively dominate those for the euro area.

2.3.2 Forecast error variance decomposition

An equally important question is whether unexpected swings in consumer confidence account for a sizeable share of the overall variability in domestic variables. In order to address this question, we compute the contribution of the identified confidence shocks to the forecast error variance decomposition (FEVD) of each variable in country i. The results are reported in Table 1.[10]

[Table 1 here]

Consider first the U.S. and the UK. In both countries, confidence shocks explain more than 50% of the variation in consumer confidence, on impact. After ten years, this fraction has increased further to 85 and 60%, respectively. In contrast, confidence shocks account for a larger share in the FEV of consumption in the UK relative to the U.S. both in the short and medium run. Although initially very small, the contribution to the overall variation in unemployment rates increases to 54% in the UK and to more than 77% in the U.S. after ten years. While the share in the FEV of real GDP is somewhat smaller, it is persistent and similar to what BNW find for the U.S., i.e., after 10 years, confidence shocks explain 35% of the fluctuations in real GDP.[11]

Interestingly, the contribution of confidence shocks to the FEVD of consumer confidence and consumption in individual euro area countries is largest for the impact period, decreasing slightly afterwards. Both shares are consistently smaller than those for the U.S. and the UK. While confidence shocks in individual euro area countries account for a modest share of the short-run variation in the unemployment rate, this share remains below 20% even after ten years. Similarly, the contribution to the FEV of real GDP is broadly constant over time and much smaller than for the U.S. and UK in the medium run (between 9% for Italy and 22% for Germany after 10 years).

Considering the euro area as a whole, the FEVD pattern of consumer confidence and consumption is hump-shaped and quantitatively more similar to those for the U.S. and UK. The share in the overall variance of the unemployment rate rises from 10 to 31% over time, while that of real GDP remains broadly constant at around 23%. The main difference relative to the U.S. and the

[10] In principle, it is straightforward to compute the FEVD, once we have obtained the structural impulse response functions. Here, the matter is slightly more complicated, because the structural models are only *partially* identified. I.e., we determine the confidence shock and thus a single impulse vector $\mathbf{a}_i = \mathbf{\Lambda}_{i,0} q_i$ of the matrix of contemporaneous coefficients $\mathbf{A}_{i,0}^{-1}$. In order to determine the fraction of the total forecast error variance (FEV) attributable to the confidence shocks, we must know the space spanned by the other columns of $\mathbf{A}_{i,0}^{-1}$. Uhlig (2005) proves that, for this purpose, it is sufficient to determine a hypothetical matrix of contemporaneous coefficients, $\tilde{\mathbf{A}}_{i,0}^{-1}$, which satisfies $\tilde{\mathbf{A}}_{i,0}^{-1}\left(\tilde{\mathbf{A}}_{i,0}^{-1}\right)' = \mathbf{\Sigma}_{i,e}$, and where $\mathbf{a}_i$ is a column vector of $\tilde{\mathbf{A}}_{i,0}^{-1}$. We follow Uhlig (2005) and compute the hypothetical impulse vectors by means of an eigenvalue-eigenvector decomposition of the matrix

$$\tilde{\mathbf{\Sigma}}_{i,e} \equiv \mathbf{\Sigma}_{i,e} - \mathbf{a}_i \mathbf{a}_i'.$$

Without loss of generality, we obtain $\hat{\mathbf{\Lambda}}_{i,0}$ from the Cholesky decomposition of $\hat{\mathbf{\Sigma}}_{i,e}$ and assume that $\mathbf{a}_i$ is the first column of the matrix $\tilde{\mathbf{A}}_{i,0}^{-1}$.

[11] In BNW the contribution of confidence shocks varies between 24 and 62% in a 7-variable system, depending on which identification scheme is used.

UK is that EA confidence shocks account for a smaller FEV share of consumer confidence and a larger FEV share of real interest rates.

2.3.3 Cross-country correlation of confidence shocks

The above impulse response functions and FEVD suggest that, on average over the sample period, shocks to consumer confidence are an important driver – whether as an exogenous source or as an endogenous channel – of real economic activity in the countries in our sample. However, the benchmark VAR suffers from two important shortcomings. By construction, the "closed-economy" models cannot account for the potential interaction between countries within our sample or with the global economy, precluding thus an analysis of the international transmission of confidence shocks.

[Figure 6 here]

Moreover, Figure 6 illustrates that the time series of confidence shocks we identify based on the structural VAR in (1) are not orthogonal, but significantly mutually correlated – contemporaneously and occasionally also at a lead or lag. As a consequence, we cannot credibly interpret the identified shocks as "country-specific" and the impulse response functions in Figures 1 to 5 as, e.g., the response of the U.S. economy to a U.S. confidence shock. Instead, this result supports the idea that confidence shocks are global in nature. The following section aims at confirming this view by isolating the country-specific component of confidence shocks and by studying their international transmission.

3 An International Factor-Augmented VAR (FAVAR) Model

We are interested in the effects of a confidence shock in one sample country on the variables in all other sample countries. It would therefore be highly inefficient or rather impossible to include all foreign variables of interest in a large-scale VAR model. A convenient alternative approach to analysing the international transmission of confidence shocks is by augmenting the benchmark VAR in (2) by so-called *factors*, i.e. common components that are prevalent in all other and possibly third countries. This approach allows us to isolate the idiosyncratic component of confidence shocks, which – according to our empirical results – turn out to be relatively small, confirming thus the importance of the global dimension of confidence shocks.

3.1 FAVAR specification

For each country i, we estimate a reduced-form FAVAR along the lines of the two-step estimation approach in Bernanke et al. (2005):

$$\begin{bmatrix} \mathbf{f}_{i,t} \\ \mathbf{y}_{i,t} \end{bmatrix} = \Phi_i(L) \cdot \begin{bmatrix} \mathbf{f}_{i,t-1} \\ \mathbf{y}_{i,t-1} \end{bmatrix} + \mathbf{v}_{i,t}, \tag{5}$$

where $\Phi_i(L)$ is a finite-order lag polynomial and $\mathbf{y}_{i,t}$ denotes the same vector of observable variables as in (1). $\mathbf{f}_{i,t}$ is a $(K \times 1)$ vector of country-specific unobservable driving forces or *factors.* Finally, $\mathbf{v}_{i,t}$ is a vector of possibly contemporaneously correlated reduced-form disturbances.

Note that the specification in (5) nests the benchmark VAR. Unless all terms of $\Phi_i(L)$ that relate $\mathbf{y}_{i,t}$ to $\mathbf{f}_{i,t-1}$ are zero, however, the model in (5) is a FAVAR and estimating a VAR in $\mathbf{y}_{i,t}$ only, i.e. omitting the factors $\mathbf{f}_{i,t}$, leads to biased results for the coefficients $\mathbf{B}_i$ in (2). The VAR in $(\mathbf{f}'_{i,t}, \mathbf{y}'_{i,t})$ cannot be estimated directly, if the factors are unobservable. Suppose that there is a large number N of *informational variables*, where $N > T$ potentially, such that

$$\mathbf{X}_{i,t} = \mathbf{D}_i^f \cdot \mathbf{f}_{i,t} + \mathbf{D}_i^y \cdot \mathbf{y}_{i,t} + \gamma_{i,t}, \tag{6}$$

where $\mathbf{D}_i^f$ and $\mathbf{D}_i^y$ are $(N \times K)$ and $(N \times 5)$ matrices of factor loadings. If N were small, we could simply include the vector $\mathbf{X}_{i,t}$ in the VAR. In our case, however, this is highly inefficient, as we are interested in the impulse responses of variables in several foreign countries to a domestic confidence shock. Instead, we follow Bernanke et al. (2005) and obtain the factors by means of principal component analysis of $\mathbf{X}_{i,t}$. Based on $\hat{\mathbf{f}}_{i,t}$, estimation of the unrestricted FAVAR in (5) then provides consistent estimates of the reduced-form coefficients.

For this purpose, we determine the space spanned by the factors based on the leading principal components of $\mathbf{X}_{i,t} = \hat{C}(\mathbf{f}_{i,t}, \mathbf{y}_{i,t})$. When N is large and the number of principal components is at least as large as the number of true factors, the space spanned by $\mathbf{f}_{i,t}$ and $\mathbf{y}_{i,t}$ is correctly recovered.

In addition to the time series in the benchmark VAR in (2), the FAVAR approach requires a sufficiently large set of informational variables in the vector $\mathbf{X}_{i,t}$. For each $i \in \{US, UK, FR, DE, IT, EA\}$, $\mathbf{X}_{i,t}$ contains the period-t observations of all sample countries $j \neq i$ as well as the period-t observations of the same variables for a number of third countries, listed in Appendix A.[12]

3.2 Identification

As before, we impose that a wave of consumer optimism in country i must raise domestic consumer confidence, private consumption, and the real interest rate for at least $R = 1$ quarters. In addition, we assume that the factors in $\mathbf{f}_{i,t}$ do not respond to a country-specific confidence shock *within the same quarter*, i.e., the contemporaneous covariance matrix of $v_{i,t}$ is assumed to be block-recursive. Note that this assumption does not restrict the impact response of *individual* foreign variables but that of the extracted *common components.* Nevertheless, block recursiveness of the covariance matrix implies that the comovement of the variables in $X_{i,t}$ will be associated with the global confidence cycle rather than country-specific disturbances. As a consequence, our identification strategy can be considered as relatively conservative. It yields a credible lower bound to the effects

[12]Suppose, e.g., that $i = US$. In this case, all observables of UK, FR, DE, IT, and EA are part of the corresponding set of informational variables, $\mathbf{X}_{US,t}$. Due to the incomplete availability of data going back to 1985Q1, not all variables are included for each third party country, i.e., $\mathbf{X}_{i,t}$ is balanced but "asymmetric".

of country-specific confidence shocks.[13]

Although we do not include any of the variables in $\mathbf{X}_{i,t}$ directly into (5), the FAVAR approach allows to compute the corresponding impulse response functions from equation (6), after obtaining those for the variables in $(\hat{\mathbf{f}}'_{i,t}, \hat{\mathbf{y}}'_{i,t})$.

For the numerical implementation, we replace the minimisation problem in (3) by

$$q_i^* = \arg\min_{q_i} \mathbf{\Psi}(q_i) \quad s.t. \quad (1)\ q_i' q_i = 1, \quad (2)\ C_{K,\mathbf{a}_i}(0) q_i = 0, \tag{7}$$

where $C_{K,\mathbf{a}_i}(0)$ denotes the first K rows of the impact matrix of impulse responses to a confidence shock in country i, which are associated with $\hat{\mathbf{f}}_{i,t}$. Note that we again minimise the criterion function in (4), while q_i now corresponds to a $((K+5)\times 1)$ unit vector of the orthonormal matrix Q_i.

Inference is based on an "approximately Bayesian" approach.[14] For the state equation of the FAVAR in (5), we impose a conjugate but diffuse Normal-Wishart prior and take 500 draws from the corresponding posterior distribution (compare subsection 2.2). For each draw d, the criterion function in (7) is minimised in order to determine a unique impulse vector $q_{i,d}^*$ and to compute impulse response functions of the factors and domestic variables from the state equation.

Based on the factors extracted from principal component analysis, the reduced-form errors $\gamma_{i,t}$ of the observation equation in (6) are virtually uncorrelated. $\hat{D}_i^f$, $\hat{D}_i^y$, and $\hat{\gamma}_{i,t}$ can therefore be estimated using equation-by-equation OLS. We assume a conjugate but diffuse Inverse-Gamma prior for the diagonal entries of $\mathbf{\Gamma}_i = E\left[\gamma_{i,t}\gamma_{i,t}'\right]$ and that $\mathbf{\Gamma}_{i,jj'} = 0, j \neq j'$. Realisations of the corresponding slope parameters $\hat{D}_{i,j}^f$ and $\hat{D}_{i,j}^y$ of equation j are then drawn from a Normal posterior distribution, conditional on the draw of $\mathbf{\Gamma}_{i,jj}$. We can now compute the impulse response function of any variable in $\mathbf{X}_{i,t}$ to a confidence shock in country i for each draw d.

3.3 Empirical results

Insofar as the pattern in Figure 6 arises from a common global confidence cycle rather than from cross-country linkages, we should be able to control for the positive contemporaneous correlation of country-specific confidence shocks by augmenting the benchmark VAR by *factors*. As outlined in subsection 3.1, our FAVAR specification follows Bernanke et al. (2005).

For each country i, $\hat{\mathbf{f}}_{i,t}$ corresponds to the principal components extracted from the variables of

[13]Bernanke et al. (2005) propose to first remove any direct dependence of $\hat{C}(\mathbf{f}_{i,t}, \mathbf{y}_{i,t})$ on $\mathbf{y}_{i,t}$ by running a multiple regression of the form

$$\hat{C}(\mathbf{f}_{i,t}, \mathbf{y}_{i,t}) = b_{i,C^*} \cdot \hat{C}^*(\mathbf{f}_{i,t}) + b_{i,y} \cdot \mathbf{y}_{i,t} + \delta_{i,t},$$

where $\hat{C}^*(\mathbf{f}_{i,t})$ represents an estimate of all common components other than $\mathbf{y}_{i,t}$ that is orthogonal by construction. Bernanke et al. (2005) suggest extracting principal components from a subset of *slow-moving* variables in $\mathbf{X}_{i,t}$, which are assumed not to be affected contemporaneously by $\mathbf{y}_{i,t}$, in order to obtain $\hat{C}^*(f_{i,t})$ and to construct $\hat{\mathbf{f}}_{i,t} = \hat{C}(\mathbf{f}_{i,t}, \mathbf{y}_{i,t}) - b_{i,y} \cdot \mathbf{y}_{i,t}$, before estimating a VAR in $\hat{\mathbf{f}}_{i,t}$ and $\mathbf{y}_{i,t}$. In the present context, however, the resulting structural confidence shocks remain contemporaneously correlated, indicating a failure of this approach to identify country-specific disturbances.

[14]Note that a "fully Bayesian" approach to inference uses the joint posterior density of the factors and the parameters, as in the one-step estimation by Gibbs sampling in Bernanke et al. (2005) and Amir-Ahmadi and Uhlig (2009). We include this as a robustness check in subsection 4.4.

all other countries $j \neq i$ in the sample as well as a set of third-country variables. In a first step, we report the variance share of selected variables explained by these factors. We then present the impulse response functions to an idiosyncratic confidence shocks and find that their effects are lower than those based on the VAR models in the previous section. We also find that the transmission of country-specific confidence shocks to the rest of the world is statistically significant for foreign confidence indicators, yet insignificant for most macroeconomic variables. This supports the view that confidence shocks remain global and that country-specific events affecting domestic confidence will be transmitted mainly to foreign confidence. We proceed by confirming these results by a forecast error variance decomposition (FEVD). Finally, we show that the FAVAR is successful in separating the global from the idiosyncratic components of confidence shocks. As the latter are now largely orthogonal across countries, they can be interpreted as *country-specific* innovations.

3.3.1 Share of variance explained by common factors

A first question of interest is, how well the extracted factors capture the common movement of the informational variables in $\mathbf{X}_{i,t}$. Table 2 reports the share of the variance of selected variables explained by $K = 3$ common factors in $\hat{\mathbf{f}}_{i,t}$ and by the common factors together with the domestic variables in $\mathbf{y}_{i,t}$, respectively, for all $i \in \{US, UK, DE, FR, IT, EA\}$.

Due to the fact that $\mathbf{X}_{i,t}$ merely differs by five out of 55 variables, the global factors in $\hat{\mathbf{f}}_{i,t}$ are very similar $\forall i$, by construction. It is therefore not surprising that the R^2 in the corresponding columns of Table 2 are also very similar across countries. We find that three principal components are generally sufficient for explaining more than 50% of the variation in the informational variables in the sample, while the share is even higher if we add the domestic variables.[15] Note that, in case of the EA variables, R^2 occasionally exceeds 80% for $\hat{\mathbf{f}}_{i,t}$ and 90% for $(\hat{\mathbf{f}}'_{i,t}, \mathbf{y}'_{i,t})'$.

[Table 2 here]

Table 2 also illustrates an interesting country- and variable-specific pattern in the share of variance explained by the common factors. We find that the R^2 of three factors alone is lowest for Italian consumer confidence, German private household consumption, U.S. short-term real interest and unemployment rates, and German real GDP, respectively. Surprisingly, these observations hold regardless of i. Accordingly, we conclude that the first three principal components of $\mathbf{X}_{i,t}$ have comparatively less explanatory power for Italian consumer sentiment, German real economic activity, and U.S. interest rates and unemployment.

3.3.2 Impulse response analysis

The inclusion of principal components in the FAVAR allows us to compute the impulse response function of each variable in the set of informational variables $\mathbf{X}_{i,t}$ to a structural confidence shock in country i, without adding an exhaustive number of variables to the VAR in (1).

[15] The corresponding R^2 of third-country informational variables are not reported here. They are available from the authors upon request.

Figures 7 to 11 plot the impulse response functions of domestic variables to a typical positive confidence shock in five individual countries and the euro area as a whole. All results are based on the FAVAR model in (5) and (6) with $K = 3$ principal components. Confidence shocks are identified by a combination of sign restrictions and exclusion restrictions on the impact responses of $\mathbf{y}_{i,t}$ and $\hat{\mathbf{f}}_{i,t}$, respectively, i.e. $R = 1$. Note that the results presented below are qualitatively and quantitatively *robust to using up to six principal components* extracted from $\mathbf{X}_{i,t}$. Due to our conservative identifying strategy, the domestic and international effects of country-specific confidence shocks should be interpreted as a lower bound.

[Figure 7 here]
[Figure 8 here]
[Figure 9 here]
[Figure 10 here]
[Figure 11 here]

In brief, the impulse responses of domestic variables are qualitatively very similar to those in Figures 1 to 5 based on the benchmark VAR. In all cases, the effects on consumer confidence and real private consumption become less persistent, especially for DE, FR, IT, and EA. Obviously, the strong comovement of individual countries with the euro area as a whole implies that a large share of fluctuations is attributed to global components. Similarly, the initial increase in domestic interest rates dies off quickly in the FAVAR, while the decrease in the unemployment rate becomes less pronounced and lasts for a shorter period. The impulse responses of domestic real GDP reflect those of the corresponding unemployment rates. Quantitatively, all impulse response functions are significantly attenuated relative to those based on the VAR model in (1). In particular, the impact on domestic GDP is not significant in most cases (except in the UK).

Figures 12 to 17 illustrate the international transmission of a typical positive confidence shock in country $i \in \{US, UK, DE, FR, IT, EA\}$ to all $j \neq i$. To improve the visibility of the plots, only the impulse responses of foreign consumer confidence, consumption, and real GDP are shown. As before, the response of consumer confidence is expressed in terms of its standard deviation, while real private consumption and real GDP correspond to cumulated percent changes. Note that each figure is associated with a confidence shock originating from a different country, e.g. from the U.S. in case of Figure 12.

[Figure 12 here]
[Figure 13 here]
[Figure 14 here]
[Figure 15 here]
[Figure 16 here]
[Figure 17 here]

On average over the sample period, U.S. confidence shocks lead to a hump-shaped response of consumer confidence in the UK, Germany, France, and the euro area as a whole, whereas Italian confidence peaks in the second quarter, before converging back to zero. In most cases, we find a significantly positive effect on foreign real economic activity. Quantitatively, the spill-over on foreign consumption and foreign real GDP is more pronounced for the UK than for France, Italy, and the aggregate euro area. Interestingly, U.S. confidence shocks do not have a statistically significant impact on German consumption and real GDP.[16]

A typical positive confidence shock in the UK induces a hump-shaped response of consumer confidence in all other countries in the sample (see Figure 13). Similar to the U.S. shock, it has a significantly positive effect on consumption and real GDP in France, Italy, and the euro area as a whole, whereas the effect on German consumption and real GDP is statistically insignificant. Interestingly, UK confidence shocks are followed by a large positive impact response of U.S. consumer confidence, while consumption and real GDP follow a hump-shaped pattern.

Figure 14 plots the impulse response functions of foreign variables to a positive German confidence shock. On average over the sample period, consumer confidence in the U.S., France, Italy, and the euro area as a whole rises immediately, whereas UK confidence decreases slightly. We do not find evidence for a transmission of German confidence shocks to foreign real economic activity. The point estimates of the cumulated responses of consumption and real GDP are even negative for IT and EA, in the medium run, although none of them is statistically significant.

The results are very similar for a typical confidence shock originating from the French economy. The latter has a significant positive impact on foreign consumer confidence during the first year, followed by some "undershooting" of confidence measures. U.S. and UK consumption and real GDP do not seem to respond, whereas we find negative point estimates of the medium-run responses for DE, IT, and EA. Note, however, that only the impulse response function of Italian consumption is statistically significant.

Figure 16 illustrates the international transmission of a typical Italian confidence shock. Surprisingly, we find a significant positive effect on consumer confidence, consumption, and real GDP in the U.S., UK, and France, whereas German variables do not seem to respond. For the euro area as a whole, only the impulse response function of consumer confidence is statistically significant.

Finally, a typical positive confidence shock in the euro area raises consumer confidence in all individual countries in the sample. The corresponding effects on consumption are most pronounced for the U.S., the UK, and France, indicating that the EA confidence cycle is predominantly associated with FR confidence shocks. The impulse response functions of foreign real GDP are not statistically significant.

Overall, there is mixed evidence for the international transmission of country-specific confidence shocks. In most cases, foreign measures of consumer confidence are positively affected. On aver-

[16]Moreover, the impulse response functions of unemployment rates (not plotted) in the UK, France, Italy, and the euro area as a whole are significantly negative for roughly twelve quarters, whereas we do not find a favorable impact of U.S. confidence shocks on German unemployment.

age over the sample period, the effect on foreign real economic activity is generally positive and significant for confidence shocks originating from the U.S. and the UK, whereas this is not the case for individual countries or the euro area as a whole. Our results confirm those in Dees and Soares-Brinca (2013), who find that country-specific confidence shocks are transmitted to foreign confidence rather than directly to foreign macroeconomic variables.

3.3.3 Forecast error variance decomposition

Moreover, we are interested in the explanatory power of confidence shocks for foreign consumer confidence, consumption, and real GDP. Although only the common principal components in $\mathbf{f}_{i,t}$, which are difficult to interpret, enter directly into the FAVAR model, it is straightforward to compute the FEVD for the entire set of informational variables in $\mathbf{X}_{i,t}$, based on the impulse response functions to a confidence shock in country i and the corresponding hypothetical matrix of contemporaneous coefficients, $\tilde{\mathbf{A}}_{i,0}^{-1}$.

Table 3 reports the contribution of country-specific confidence shocks to the FEV of domestic consumer confidence, consumption, real interest rates, unemployment rates, and real GDP, based on the FAVAR in (5). Hence, it is directly comparable to the FEVD in Table 1.

[Table 3 here]

Augmenting the benchmark VAR by common global components reduces the FEV share attributed to the structural confidence shocks, e.g. by around ten percentage points for U.S. consumer confidence and private consumption. The differences are generally larger at longer horizons, reflecting the reduced persistence of the corresponding impulse response functions. As a consequence, the FEV share is decreasing over time for those variables which are subject to sign restrictions in the impact period. For the remaining variables, the contribution of confidence shocks is increasing with the forecast horizon, yet at a relatively lower level. Note, e.g., that UK confidence shocks account for around 23% of the overall variability in domestic real GDP and the unemployment rate, on average over the sample period, as opposed to 42 and 54%, respectively, in Table 1.

The FAVAR approach facilitates going beyond the FEVD analysis of domestic variables. Table 4 reports the contribution of a confidence shock in country i to the FEV of consumer confidence, consumption, and real GDP in all $j \neq i$, together with the pointwise 16th and 84th percentiles based on 500 draws from the joint posterior distribution of the coefficients in (5) and (6).

[Table 4.a here]
[Table 4.b here]
[Table 4.c here]

Consider first the case of a typical U.S. confidence shock in the left half of Table 4.a. With the exception of $j = DE$, the latter accounts for between 10 and 40% of the FEV of foreign consumer confidence, on impact. For all countries but Italy, the contribution is largest at horizons of four to eight quarters. While the share of U.S. confidence shocks in the FEV of foreign real economic activity varies by country and forecast horizon, it is generally around 10%. Note also that, with the exception of $j = UK$, the explained percentage of fluctuations in real GDP exceeds that in private household consumption.

We obtain qualitatively similar results for a typical UK confidence shock, reported in the right half of Table 4.a. The corresponding FEV share in foreign consumer confidence is largest for the U.S. and Italy. Moreover, a surprisingly large share of the fluctuations in German consumption is attributed to UK shocks in the short run.

On average over the sample period, the contribution of idiosyncratic German and French confidence shocks to the FEV of foreign variables is an order of magnitude smaller than that of U.S. and UK confidence shocks, respectively. Nevertheless, German shocks account for almost 33% of the total variation in French and total euro area consumer confidence in the short run, while French shocks account for about 14% of the variation in Italian consumer confidence at any horizon up to 40 quarters.

Although the contribution of a typical Italian confidence shock (see Table 4.c) is of the same order of magnitude as those for $i = DE, FR$, it accounts for a larger share of the overall variance of U.S. and UK consumer confidence at horizons of one to eight quarters. Moreover, a comparatively large share of the fluctuations in German consumption is attributed to the Italian shock.

The contribution of confidence shocks associated with the euro area as a whole to the FEV of U.S. and UK variables is between those for Germany and France, respectively, and those for Italy. The right half of Table 4.c also suggests that the identified confidence shocks are mainly associated with fluctuations in consumer confidence in France and Italy as well as fluctuations in private household consumption in Germany and France. The FEV share of EA confidence shocks in U.S. and UK consumer confidence accounts for a maximum of 16 and 11% at a forecast horizon of four and eight quarters, respectively.

Two findings stand out in the analysis of impulse response functions and the FEVD. First, the effects of UK confidence shocks on the U.S. economy are sizeable, especially on impact. Second, Italian confidence shocks have a qualitatively and quantitatively significant impact on consumption and real GDP in both the U.S. and the UK. This raises the question, whether the FAVAR in (5) and (6) has been successful in identifying idiosyncratic, i.e. country-specific confidence shocks.

3.3.4 Cross-country correlation of idiosyncratic confidence shocks

Figure 18 reveals that augmenting the benchmark VAR by principal components helps to reduce the contemporaneous correlation of structural confidence shocks. The corresponding coefficients are statistically insignificant at all leads and lags, except for the contemporaneous correlation of shocks associated with Germany and France. Accordingly, the identified confidence shocks are now orthogonal up to statistical precision and can be interpreted as *country-specific* innovations.

[Figure 18 here]

Note that the shocks associated with individual euro area countries, $i = DE, FR, IT$, remain contemporaneously correlated with those for $i = EA$ even in the FAVAR model. This is a natural consequence of the fact that aggregate euro area data is composed of the data of its individual members, of which Germany, France, and Italy are the largest.[17]

4 Robustness Checks

The above results show that moving from a country-specific VAR to a multi-country FAVAR model changes the extent to which confidence shocks affect macroeconomic developments and explain business cycle fluctuations. Although the results are qualitatively the same, taking an international dimension into account tends to reduce the effects of idiosyncratic confidence shocks quantitatively. In the following, we provide a series of robustness checks in order to corroborate our findings.

4.1 Stock prices as an alternative measure of confidence

In the introduction, we have emphasised the advantages of employing a survey measure of consumer confidence in order to identify confidence shocks in the data. In the particular case of the U.S., however, BNW claim that such survey measures are inferior to observed stock prices and actual consumer spending in picking up swings in broad-based sentiments.

As a first robustness check, we therefore replicate our previous empirical analysis accounting for BNW's argument and associate an increase in optimism (or confidence) with an instantaneous increase in real stock prices and consumption. Accordingly, we replace the measure of consumer confidence by a country-specific index of stock prices in both the VAR and the FAVAR model. In line with the findings in BNW, the results are very similar to those presented in Section 3.[18] In particular, the effects of confidence shocks – or "optimism shocks", as BNW label the shock – on consumption and real GDP remain positive and significant in the country-specific VAR models. As before, expanding the model to a multi-country FAVAR reduces the impact of confidence shocks on real economic activity. Similarly, the responses of domestic and foreign real GDP remain statistically significant only in the case of an "optimism shock" emerging from the U.S..

For Germany and France, in particular, the impulse response functions, e.g. of real interest and unemployment rates, based on the VAR model with stock prices are estimated with less precision, supporting our prior arguments in favor of survey measures of consumer confidence. Moreover, the confidence shocks identified based on the VAR model with stock prices display even higher contemporaneous correlations across countries, reflecting the integration of international stock markets in developed economies. The strong comovement of stock prices at a quarterly frequency complicates

[17] EA confidence shocks correspond to structural disturbances either to the euro area as a whole or to any of its member countries. Theoretically, it should therefore be possible to further disentangle common EA from individual countries' confidence shocks. However, this exercise is beyond the scope of the present paper.

[18] Note that BNW consider the specification with stock prices as the benchmark before replicating their estimation using the University of Michigan Index of Consumer Sentiment as a robustness check.

the distinction between global and idiosyncratic components during a wave of optimism and provides yet another argument in favor of using survey measures to identify confidence shocks. The corresponding results are available from the authors upon request.

4.2 A recursive identification scheme

As mentioned in the introduction, the confidence shocks we identify could be driven either by news, i.e. information about future changes in economic conditions and policy, or by swings in the mood of consumers more in line with the "animal spirits" interpretation. Accordingly, one might argue that our identification strategy is merely picking up *standard demand shocks*. At a first glance, the impulse response functions presented in Section 3 differ from what is usually implied by a positive demand shock. Indeed, our confidence shocks lead to a very gradual increase (decrease) in real GDP (the unemployment rate), whereas a standard demand shock would imply an immediate response of real economic activity.

Nevertheless, any distinction of this kind remains prone to criticism, in particular when the identification is based on sign restrictions, as no ex-ante assumptions are made about the causal link between the endogenous variables in the VAR. As an additional robustness check, we therefore identify the confidence shocks *recursively* based on a Cholesky decomposition of the reduced-form variance covariance matrix $\Sigma_{i,e}$, where consumer confidence is ordered first in the VAR and directly after the k factors in the FAVAR model. It is straightforward to implement a recursive identification within the penalty function approach by restricting only the impulse response function of consumer confidence to be positive, on impact (compare *Identification I* in BNW). Note also that the closed-economy model is very similar to the 5-variable VAR model in Barsky and Sims (2012), except that we have substituted the unemployment rate for CPI inflation.[19]

We find that most impulse response functions based on the recursively identified VAR models with consumer confidence ordered first are qualitatively identical to those based on the benchmark specification. The only exception seems to be the real interest rate, which now falls on impact for $i = UK, IT, EA$. Although we do not impose any (sign or zero) restrictions, consumption hardly responds on impact, increases with a lag, and remains elevated for most countries even after 40 quarters. Real economic activity, i.e. domestic real GDP and the unemployment rate, evolves accordingly.

In the recursively identified FAVAR model, the impulse responses of domestic consumption and real GDP are significantly positive only for the U.S. and the UK. In line with our prior findings, only U.S. and UK confidence shocks are associated with a statistically significant increase in foreign real economic activity. Overall, the consequence of imposing sign restrictions also on the impact response of consumption and real interest rates rather than just on consumer confidence seems to be of second order importance. The corresponding impulse response functions and further results

[19] Barsky and Sims (2012) estimate the parameters of a DSGE model with both "news" shocks and "animal spirits" by matching the impulse response functions obtained from their 5-variable VAR.

are available from the authors upon request.

Barsky and Sims (2012) compare the impulse responses to an orthogonal innovation in consumer confidence in a 3-variable VAR model with confidence ordered first and last, respectively, in order to quantify the *incremental* information in the survey data not already contained in consumption and real GDP. Instead, we stick to our preferred Cholesky ordering, as this implies that consumer confidence responds only to "confidence shocks" within the same quarter, whereas orthogonal innovations in income, real interest rates, and the unemployment rate affect consumer confidence with a lag. In any case, the results in Barsky and Sims (2012) are qualitatively very robust to the position of the confidence variable in the VAR.

4.3 Including CPI into the VAR and FAVAR models

Note that the sign restrictions we impose on the impact responses of consumer confidence and real private consumption are, in principle, also compatible with the responses to a positive shock to TFP derived from a standard neoclassical real business cycle (RBC) model. As a third robustness check, we therefore split up the country-specific real interest rates into the underlying time series, i.e. nominal short-term interest rates and consumer price indices. This alternative specification of the VAR in (1) and the FAVAR in (5) allows us to refine our identification strategy.

In their paper, BNW try to identify "optimism shocks" that are orthogonal to "economic fundamentals" by adding a measure of U.S. TFP to the structural VAR model and by imposing a zero restriction on the impact response of this variables to the shock in question. Unfortunately, similar time series are not available for any of the European countries in our sample. As a consequence, we tentatively distinguish between a positive "confidence shock" and a positive supply shock by directly including a price variable into the VAR and FAVAR models. This enables us to impose an additional sign restriction on the impulse response function of the consumer price index in response to a positive confidence shocks. Consistent with the predictions of a standard neoclassical RBC model, the response of the price level must be nonnegative on impact.[20]

Ex ante, it is not clear which part of the confidence shocks identified in the 5-variable models will survive in a 6-variable specification with sign restrictions imposed directly on the impact response of the price level. We find that the results for the VAR model are qualitatively very similar to those based on the benchmark specification, albeit the increase (decrease) in consumer confidence (the unemployment rate) is somewhat less persistent for the UK. While we impose a positive sign restriction, the price level hardly responds on impact, instead slowly rising for more than three years in the U.S. and over the entire forecast horizon for $i = DE, FR, IT, EA$. Moreover, the *nominal* short-term interest rate slightly increases on impact and follows a pronounced hump-shaped pattern afterwards, although we do *not* impose any restriction on it.

[20]BNW analyse two specifications, including either the factor utilisation-adjusted TFP series constructed in Basu et al. (2006) or an unadjusted TFP series. Although a direct measure of (factor utilisation-adjusted) TFP is clearly preferable to simply adding the consumer price index, we consider the results from this robustness check as suggestive evidence for the orthogonality of confidence shocks w.r.t. supply shocks.

The similarity of the impulse response functions of domestic variables with those in the benchmark specification carries over to the FAVAR model. While the increase in nominal interest rates remains hump-shaped and significant, except for France, none of the price level responses is statistically significant after about three years. Regarding the international transmission of confidence shocks, we again find that only U.S. and UK confidence shocks have a statistically significant impact on foreign real economic activity. Interestingly, the puzzling effect of Italian shocks on foreign confidence and consumption becomes quantitatively smaller and less significant. The corresponding impulse response functions and further results are available from the authors upon request.

4.4 One-step estimation by Gibbs sampling

Note that, in the two-step estimation approach, we do not respect that the factors in (5) and (6) represent generated regressors. Due to the fact that we use a penalty function approach to identify orthogonal innovations in consumer confidence and draw from the posterior distribution of the reduced-form parameters for inference, the type of bootstrap bias correction proposed by Kilian (1998) and applied in Bernanke et al. (2005) would mix Bayesian and frequentist econometrics and would thus be methodologically inconsistent.

For these reasons, we rely on an alternative one-step estimation procedure based on multi-move Gibbs sampling as a final robustness check. The advantage of this "fully Bayesian" approach is that it explicitly accounts for the factor structure in the FAVAR model. At the same time, monitoring the convergence of the Gibbs sampler is not straightforward. Since we are somewhat less confident of our results based on the fully Bayesian approach, we prefer to keep the two-step estimation as our baseline.[21] Our robustness checks are based on 50,000 simulation draws of the Gibbs sampler. We discard the first 49,000 draws as a burn-in phase and apply the penalty function approach to the last 1,000 draws in order to compute point-wise medians and percentiles of the impulse response functions to a positive confidence shock.

Although the one-step estimation approach differs from the two-step estimation approach in several dimensions (compare Bernanke et al., 2005), our conclusions remain qualitatively intact. Once we account for the international dimension of confidence shocks, the positive effect of country-specific innovations on domestic and foreign real economic activity is significantly reduced. Quantitatively, however, the impulse response functions of domestic variables become more pronounced for $i = DE, UK$ and less pronounced for $i = US, UK$. This is reflected also in a reduced transmission to foreign confidence and real economic activity, in particular for shocks emerging from the UK. At the same time, EA confidence shocks now imply a positive short-run response of confidence, consumption, and real GDP in individual euro area countries and a statistically significant positive response of real economic activity for $j = US, UK$ in the longer run. All results based on the alternative estimation strategy are available from the authors upon request.

[21]Except for the identification strategy, we follow the one-step estimation approach in Bernanke et al. (2005) for a recursively identified structural FAVAR. See also Amir-Ahmadi and Uhlig (2009) for a Bayesian FAVAR identified by the *pure-sign-restriction approach*. Both papers provide details on the estimation in their appendices.

5 Conclusion

In this paper, we employ standard econometric models for analysing the domestic and international effects of "confidence shocks". We remain neutral with regard to the interpretation of these shocks, which might represent pure mood swings as well as "news", i.e. changes in information or expectations about future economic developments or policies. Accordingly, these shocks could work both as an independent source and as a channel of business cycle fluctuations. In all our models, the identification of structural confidence shocks is based on a set of sign restrictions on the impact responses of consumer confidence, real private consumption, and short-term real interest rates.

We find that the confidence shocks identified based on our closed-economy benchmark VAR model consistently raise domestic real economic activity, as measured by consumption, real GDP, and the unemployment rate, for several years. Confidence shocks also explain an important share of business cycle fluctuations, in line with the findings in BNW. At the same time, we detect a statistically significant common component, indicating that these innovations cannot be entirely idiosyncratic or country-specific.

In order to control for global components in the confidence cycle, we augment the benchmark VAR model by factors drawn from a principal components analysis of a large set of foreign and third country variables. The resulting FAVAR model allows us to investigate the impulse responses of foreign variables to a confidence shock in a given country. This approach proves effective in removing the correlation in country-specific confidence shocks. By isolating the idiosyncratic components of confidence shocks, we then study the impact of country-specific confidence shocks on real GDP and consumption. We find that this impact becomes smaller and less persistent, indicating that a noticeable share of the confidence shocks identified in the closed-economy VARs must be attributed to common global components. Moreover, while the FAVAR reduces the contemporaneous correlations of structural confidence shocks, some nontrivial comovement remains, e.g., between the U.S. and the UK or between Germany, France, and Italy. This might be due to the transmission of innovations between these countries beyond global components.

The FAVAR results also show that, in most cases, the transmission of a confidence shock to other countries is significant for foreign consumer confidence in the short run – supporting the idea of a confidence channel in the international transmission of shocks – but insignificant for foreign consumption and real GDP. The impulse response functions of the latter variables are statistically significant only in the case of a typical innovation emerging from the U.S. and the UK. Finally, in comparison with the closed-economy benchmark VAR, the contribution of domestic confidence shocks to business cycle fluctuations drops sharply, once we take into account common components. This confirms the global dimension of confidence shocks.

Overall, our empirical evidence confirms previous findings about the role of confidence shocks in the business cycle for a larger sample of developed economies. Moreover, we show that these shocks are mainly global in nature, supporting their role in the international business cycle.

Appendix A. Data Description

All current account and confidence data for the U.S., the United Kingdom, France, Germany, and Italy are taken from the Statistical Data Warehouse (SDW) of the European Central Bank (ECB). German and Euro Area time series are extrapolated backwards to 1985Q1 using data for West Germany and from the area wide model (AWM) database. For the measure of consumer confidence, quarterly time series are obtained by taking averages of monthly observations.
Data on short-term interest rates are from the International Financial Statistics (IFS) of the IMF and corrected for inflation by subtracting annualised quarterly growth rates of the harmonised index of consumer prices (HICP).

Moreover, $\mathbf{X}_{i,t}$ contains period-t observations of a measure of confidence, consumption, interest rates, unemployment rates, and GDP for a number of third party countries, namely Australia, Brazil, Canada, Denmark, Japan, Norway, South Africa, South Korea, Sweden, and Switzerland. Due to the limited availability of data going back to 1985Q1, not all time series are included for each country and our set of informational variables in $\mathbf{X}_{i,t}$ is therefore "asymmetric".

We use data on real private household consumption and GDP from the OECD's main economic indicators (MEI) database for *seven* economies: Australia, Canada, Japan, Norway, South Africa, South Korea, and Switzerland. From the same database, we obtain consumer confidence series for the following *five* countries: Australia, Canada, Denmark, Japan, Switzerland. Third party country unemployment data is assembled from the OECD's MEI and the ECB's short-term statistics and available for Australia, Brazil, Canada, Denmark, Japan, and Sweden. Finally short-term interest rates on government securities, in particular treasury bills, are obtained from the IMF's IFS for *five* countries: Canada, Japan, South Africa, Sweden, and Switzerland. These 30 foreign variables are part of $\mathbf{X}_{i,t}$ for all i.

All variables in $\mathbf{X}_{t,i}$ are transformed to be stationary with mean 0 and variance 1, before the principal components in $\hat{C}(\mathbf{f}_{i,t}, \mathbf{y}_{i,t})$ are consistently extracted from 55 informational variables.

When correcting $\hat{C}(\mathbf{f}_{i,t}, \mathbf{y}_{i,t})$ for the direct influence of $\mathbf{y}_{i,t}$ as a robustness check, real private household consumption, the unemployment rate, and real GDP are assumed to be slow-moving. Accordingly, we extract the principal components in $\hat{C}^*(f_{i,t})$ from the corresponding subset of $\mathbf{X}_{i,t}$, which contains 35 informational variables.

Final consumption of households and NPISH's; chain linked volumes (2005):

Area	Unit	Adjustment	SDW Dataset	Transformation
US	national currency	SA	ESA95 National Accounts	*log differences*
UK	national currency	SA	ESA95 National Accounts	*log differences*
DE	national currency	SA	ESA95 National Accounts	*log differences*
FR	national currency	SA	ESA95 National Accounts	*log differences*
IT	national currency	SA	ESA95 National Accounts	*log differences*
EA	national currency	SA	ESA95 National Accounts	*log differences*

Gross domestic product at market price; chain linked volumes (2005):

Area	Unit	Adjustment	SDW Dataset	Transformation
US	national currency	SA	ESA95 National Accounts	*log differences*
UK	national currency	SA	ESA95 National Accounts	*log differences*
DE	national currency	SA	ESA95 National Accounts	*log differences*
FR	national currency	SA	ESA95 National Accounts	*log differences*
IT	national currency	SA	ESA95 National Accounts	*log differences*
EA	national currency	SA	ESA95 National Accounts	*log differences*

Standardised total unemployment rate (all ages, male and female):

Area	Unit	Adjustment	SDW Dataset	Transformation
US	% of civ. workforce	SA	STS Short-term Statistics	*levels*
UK	% of civ. workforce	SA	STS Short-term Statistics	*levels*
DE	% of civ. workforce	SA	STS Short-term Statistics	*levels*
FR	% of civ. workforce	SA	STS Short-term Statistics	*levels*
IT	% of civ. workforce	SA	STS Short-term Statistics	*levels*
EA	% of civ. workforce	SA	STS Short-term Statistics	*levels*

Consumer confidence indicator:

Area	Unit	Adjustment	SDW Dataset	Transformation
US	index number	SA	UMich Survey of Consumers	*levels*
UK	index number	SA	EU Commission confidence	*levels*
DE	index number	SA	EU Commission confidence	*levels*
FR	index number	SA	EU Commission confidence	*levels*
IT	index number	SA	EU Commission confidence	*levels*
EA	index number	SA	EU Commission confidence	*levels*

Interest rates on government securities, in particular treasury bills:

Area	Unit	Adjustment	IMF Dataset	Transformation
US	% per annum	SA	International Financial Statistics	*levels*
UK	% per annum	SA	International Financial Statistics	*levels*
DE	% per annum	SA	International Financial Statistics	*levels*
FR	% per annum	SA	International Financial Statistics	*levels*
IT	% per annum	SA	International Financial Statistics	*levels*
EA	% per annum	SA	International Financial Statistics	*levels*

Index of consumer prices; overall index, all items:

Area	Unit	Adjustment	Dataset/Index	Transformation
US	index number	SA	FRED/CPI	*annualised quarterly growth rates*
UK	index number	NSA	SDW/HICP	*annualised quarterly growth rates*
DE	index number	SA	SDW/HICP	*annualised quarterly growth rates*
FR	index number	SA	SDW/HICP	*annualised quarterly growth rates*
IT	index number	SA	SDW/HICP	*annualised quarterly growth rates*
EA	index number	SA	SDW/HICP	*annualised quarterly growth rates*

Appendix B. Further Material

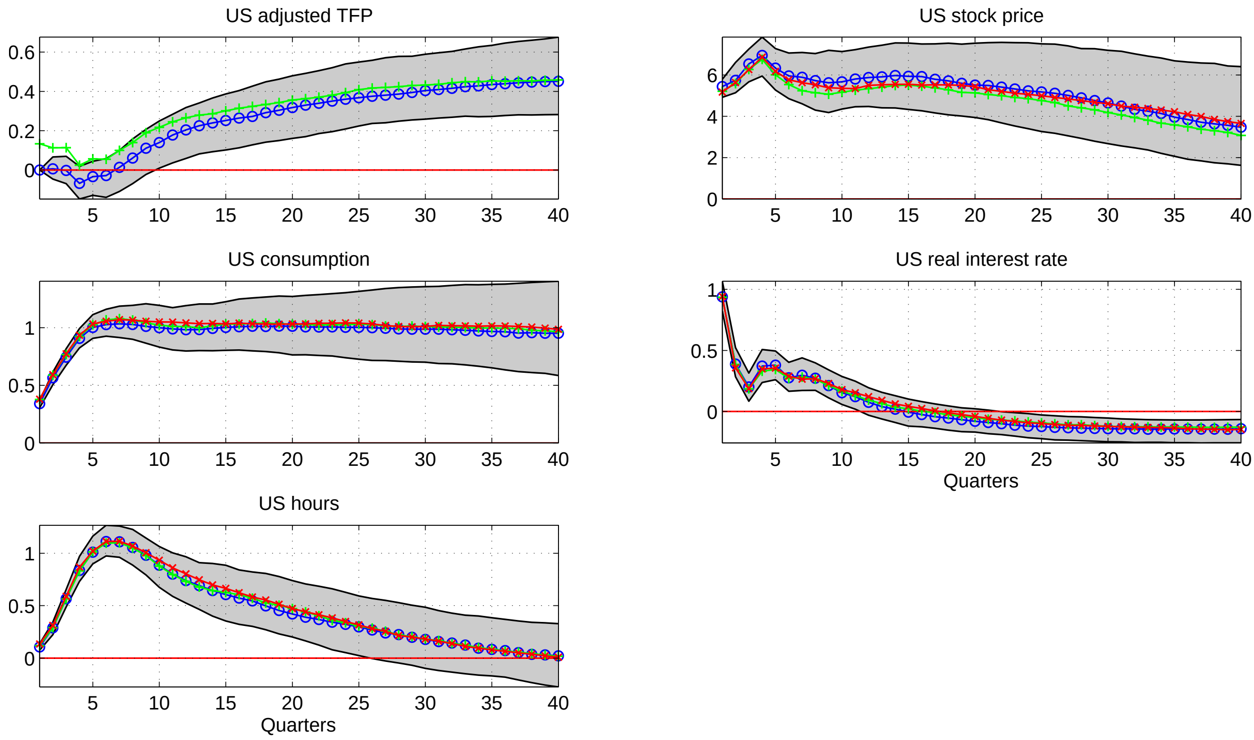

Figure B.1: Impulse response functions of U.S. variables to a domestic confidence shock based on the five-variable VAR in BNW; blue circles – Identification III (pointwise medians with pointwise 16th and 84th percentiles), green pluses – Identification III without zero restriction on adjusted TFP (pointwise medians), red crosses – four variable VAR without adjusted TFP (pointwise medians).

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Table 1: Percent contribution of consumer confidence shocks to the FEVD based on the structural closed-economy VAR model in (1)

Country:	**US**				**UK**			
Horizon:	$h = 1$	$h = 4$	$h = 8$	$h = 40$	$h = 1$	$h = 4$	$h = 8$	$h = 40$
Consumer Confidence	68.4466 [62.3 73.3]	80.9875 [70.6 84.1]	83.7933 [70.4 85.1]	85.2004 [67.0 84.9]	52.0615 [45.6 58.7]	56.1679 [43.9 63.1]	59.3449 [42.3 66.8]	60.4131 [41.5 67.8]
Private Consumption	34.9322 [27.4 43.3]	45.8673 [36.5 52.6]	50.2375 [40.0 56.6]	51.0980 [40.8 61.4]	52.3775 [45.6 58.7]	61.5608 [51.9 65.1]	64.3370 [51.9 66.5]	62.1474 [48.2 65.0]
Real Interest Rate	36.1958 [28.3 43.9]	35.4310 [25.6 42.5]	38.0397 [27.2 45.7]	47.9752 [34.4 60.5]	17.4367 [10.8 24.4]	25.7802 [16.1 32.8]	33.6325 [21.0 42.1]	35.4125 [23.0 46.0]
Unemployment Rate	5.9270 [2.4 11.8]	30.4119 [20.9 40.7]	57.2046 [42.9 66.9]	77.0620 [56.8 79.9]	1.7861 [0.2 5.0]	24.9712 [15.3 33.9]	41.3169 [25.9 51.8]	54.0351 [25.4 68.5]
Real GDP	12.4011 [6.4 19.3]	30.3313 [21.4 39.3]	34.5621 [25.0 43.5]	34.6400 [26.3 49.9]	18.5512 [11.7 26.6]	39.9629 [29.0 47.1]	42.5566 [29.8 49.9]	42.4375 [30.0 50.5]
Country:	**DE**				**FR**			
Consumer Confidence	39.0293 [32.3 47.0]	35.2258 [24.8 44.5]	32.1187 [20.4 42.4]	30.5992 [19.8 39.0]	50.8787 [43.3 57.9]	45.8430 [35.3 54.9]	39.8769 [28.8 48.9]	36.2975 [23.7 43.7]
Private Consumption	39.7097 [32.1 46.4]	32.2104 [25.4 38.5]	31.8202 [25.1 37.8]	31.6661 [24.2 37.5]	39.6734 [32.4 47.8]	37.9110 [30.3 44.5]	37.5537 [29.6 44.0]	36.7790 [28.2 42.1]
Real Interest Rate	64.9555 [59.5 70.9]	59.7186 [49.0 66.1]	61.1928 [47.0 66.6]	60.5324 [38.5 62.2]	36.5527 [29.1 43.2]	23.7140 [15.9 32.1]	19.3388 [11.5 28.6]	15.3482 [7.5 25.0]
Unemployment Rate	8.3552 [3.6 13.9]	12.3992 [4.9 20.5]	9.0810 [2.6 19.0]	5.8371 [3.9 20.6]	1.4825 [0.2 4.9]	17.9806 [10.3 28.4]	17.8600 [8.2 29.3]	14.3087 [5.9 26.3]
Real GDP	22.7098 [15.1 29.7]	22.1086 [15.1 29.2]	22.3108 [15.6 29.5]	22.3936 [15.5 29.7]	9.6530 [5.2 15.9]	10.4703 [6.3 18.6]	11.5374 [7.4 19.4]	11.8286 [7.6 20.3]
Country:	**IT**				**EA**			
Consumer Confidence	32.5177 [25.0 40.7]	31.1096 [21.2 39.9]	29.6724 [18.7 39.1]	24.9759 [16.8 36.1]	30.0106 [23.4 37.8]	33.2110 [23.3 42.4]	37.8685 [24.3 47.6]	33.1642 [21.9 42.4]
Private Consumption	33.0317 [25.9 40.5]	31.9661 [24.1 38.5]	31.5897 [23.4 38.1]	30.3796 [22.6 38.2]	48.8489 [41.8 55.6]	49.2553 [40.6 54.2]	51.2598 [41.3 56.4]	48.9089 [38.1 53.7]
Real Interest Rate	34.8713 [27.4 41.8]	46.6090 [34.3 54.6]	52.9401 [34.9 62.5]	53.6743 [28.0 65.2]	43.9519 [36.1 51.7]	50.3552 [37.0 58.8]	59.4152 [42.3 67.2]	64.3304 [37.1 69.3]
Unemployment Rate	0.0983 [0.0 2.1]	2.2902 [0.5 6.8]	1.4296 [0.7 6.5]	17.4404 [4.8 36.3]	10.3665 [5.1 16.6]	21.3350 [13.0 30.2]	27.3323 [15.9 39.0]	31.1899 [15.1 49.6]
Real GDP	5.9152 [2.5 11.4]	7.8036 [3.9 14.6]	7.7246 [4.5 15.2]	8.7854 [6.1 18.4]	19.4495 [11.9 26.2]	23.8588 [16.5 31.6]	24.6914 [16.7 33.1]	23.5356 [16.7 33.6]

Note: Numbers correspond to the point estimates of the FEV shares at horizon h conditional on data for 1985Q1-2011Q4, while numbers in brackets correspond to the pointwise 16th and 84th percentiles based on 500 draws from the Normal-Wishart posterior of the reduced-form parameters.

Table 2: Share of variance explained by three common factors based on the FAVAR measurement equation in (6)

Country i**:**		**US**		**UK**		**DE**		**FR**		**IT**		**EA**	
Regressors:		$\hat{\mathbf{f}}'_{i,t}$	$(\hat{\mathbf{f}}'_{i,t}, \mathbf{y}'_{i,t})$	$\hat{\mathbf{f}}'_{i,t}$	$(\hat{\mathbf{f}}'_{i,t}, \mathbf{y}'_{i,t})$	$\hat{\mathbf{f}}'_{i,t}$	$(\hat{\mathbf{f}}'_{i,t}, \mathbf{y}'_{i,t})$	$\hat{\mathbf{f}}'_{i,t}$	$(\hat{\mathbf{f}}'_{i,t}, \mathbf{y}'_{i,t})$	$\hat{\mathbf{f}}'_{i,t}$	$(\hat{\mathbf{f}}'_{i,t}, \mathbf{y}'_{i,t})$	$\hat{\mathbf{f}}'_{i,t}$	$(\hat{\mathbf{f}}'_{i,t}, \mathbf{y}'_{i,t})$
Confidence	US	0.5831	1*	0.6579	0.7644	0.6986	0.8076	0.7097	0.7679	0.6625	0.7765	0.7268	0.8358
	UK	0.6216	0.6903	0.5797	1*	0.6557	0.7340	0.6719	0.6877	0.6457	0.7115	0.6782	0.7127
	DE	0.5841	0.5996	0.5884	0.6656	0.4663	1*	0.5835	0.7374	0.5811	0.6094	0.5584	0.8570
	FR	0.5881	0.6762	0.5977	0.6882	0.6068	0.7434	0.5628	1*	0.6324	0.6903	0.5748	0.8198
	IT	0.3587	0.4997	0.3840	0.4859	0.4211	0.5447	0.3970	0.4564	0.3570	1*	0.3853	0.6281
	EA	0.6809	0.7703	0.7055	0.7318	0.6842	0.9074	0.6844	0.8769	0.7098	0.8457	0.6616	1*
Consumption	US	0.4665	1*	0.5589	0.5731	0.5707	0.5772	0.5832	0.5999	0.5754	0.5926	0.5811	0.6066
	UK	0.4488	0.5076	0.3658	1*	0.4798	0.5469	0.4927	0.5332	0.4762	0.4963	0.5052	0.5854
	DE	0.1781	0.2316	0.1830	0.2580	0.1206	1*	0.1744	0.2430	0.1816	0.2643	0.1447	0.6590
	FR	0.3286	0.3422	0.3237	0.3404	0.3213	0.4030	0.2675	1*	0.3305	0.3807	0.3040	0.5464
	IT	0.3716	0.4037	0.3738	0.4198	0.3713	0.3822	0.3759	0.4387	0.3107	1*	0.3609	0.4211
	EA	0.6044	0.6379	0.6055	0.6295	0.5386	0.8209	0.5609	0.7152	0.5773	0.6354	0.5162	1*
Interest Rate	US	0.3030	1*	0.3624	0.4138	0.3655	0.5216	0.3620	0.4820	0.3446	0.4372	0.3585	0.5428
	UK	0.4343	0.5841	0.4239	1*	0.4944	0.5913	0.4750	0.5938	0.4588	0.5077	0.4685	0.5700
	DE	0.6207	0.7479	0.6518	0.7067	0.5993	1*	0.6308	0.7545	0.6298	0.6844	0.6108	0.8399
	FR	0.8339	0.8833	0.8448	0.8741	0.8330	0.8856	0.8204	1*	0.8350	0.8773	0.8218	0.9301
	IT	0.8659	0.8964	0.8691	0.8889	0.8721	0.8850	0.8656	0.8938	0.8473	1*	0.8656	0.9104
	EA	0.8863	0.9405	0.9027	0.9255	0.8921	0.9554	0.8862	0.9570	0.8880	0.9329	0.8784	1*
Unemployment	US	0.2615	1*	0.3014	0.6996	0.3677	0.5708	0.3389	0.5512	0.3501	0.5503	0.3372	0.6472
	UK	0.6363	0.8187	0.5755	1*	0.6672	0.7559	0.6190	0.7428	0.6509	0.6908	0.6290	0.8411
	DE	0.5336	0.6363	0.5357	0.6343	0.4882	1*	0.5806	0.6845	0.5675	0.6438	0.5811	0.7395
	FR	0.7863	0.7951	0.7801	0.8224	0.8114	0.8440	0.6961	1*	0.7378	0.8433	0.7228	0.9188
	IT	0.5150	0.6325	0.5608	0.5860	0.5614	0.6436	0.5304	0.6695	0.4503	1*	0.5492	0.7461
	EA	0.7843	0.8169	0.7619	0.8554	0.8061	0.8538	0.6991	0.9133	0.7498	0.8290	0.6873	1*
Real GDP	US	0.5007	1*	0.5620	0.5908	0.5757	0.5883	0.5623	0.6140	0.5801	0.5856	0.5640	0.5926
	UK	0.5956	0.6238	0.5111	1*	0.6027	0.6065	0.6003	0.6079	0.6122	0.6325	0.5999	0.6173
	DE	0.3525	0.4854	0.3394	0.4133	0.2462	1*	0.3077	0.4085	0.3083	0.4470	0.2595	0.8202
	FR	0.7275	0.7580	0.7234	0.7680	0.6947	0.7687	0.6516	1*	0.6935	0.7385	0.6722	0.7978
	IT	0.5836	0.6149	0.5461	0.5893	0.5268	0.5953	0.5429	0.6281	0.4911	1*	0.5259	0.6576
	EA	0.6968	0.7431	0.6841	0.7203	0.6062	0.9096	0.6361	0.7766	0.6422	0.7526	0.5907	1*

Note: Numbers correspond to the point estimates of R^2 based on a multivariate regression of $\mathbf{X}_{i,t}$ on $\hat{\mathbf{f}}'_{i,t}$ and $(\hat{\mathbf{f}}'_{i,t}, \mathbf{y}'_{i,t})$, respectively. * by construction.

Table 3: Percent contribution of consumer confidence shocks to the FEVD of domestic variables based on FAVAR model in (5) and (6)

Country:	**US**				**UK**			
Horizon:	$h = 1$	$h = 4$	$h = 8$	$h = 40$	$h = 1$	$h = 4$	$h = 8$	$h = 40$
Consumer Confidence	62.4979 [52.1 68.7]	59.6510 [43.1 64.9]	51.7518 [34.5 55.7]	22.3443 [13.1 30.6]	30.8348 [24.1 38.0]	32.9610 [22.3 41.4]	35.7173 [21.6 42.6]	32.1194 [16.8 37.3]
Private Consumption	22.8875 [15.9 30.8]	21.5407 [14.9 26.2]	21.0192 [14.7 25.8]	18.2722 [12.5 23.0]	48.0483 [38.4 54.0]	48.1477 [35.6 50.6]	48.2363 [33.6 49.6]	43.4512 [26.7 43.3]
Real Interest Rate	26.9624 [19.3 33.7]	23.6068 [16.1 28.8]	21.8533 [14.9 26.7]	15.4333 [10.8 22.1]	33.0368 [24.7 39.7]	28.5405 [19.6 32.8]	29.6570 [19.1 34.6]	26.2226 [14.8 31.5]
Unemployment Rate	1.7713 [0.2 4.9]	5.4764 [1.5 10.6]	14.4665 [5.1 21.9]	6.1611 [3.7 14.2]	0.1221 [0.0 2.0]	9.2561 [3.7 15.0]	22.4759 [11.3 30.3]	23.3310 [8.7 31.8]
Real GDP	1.9880 [0.4 5.1]	3.3887 [2.3 7.1]	4.6040 [3.1 8.9]	6.7155 [4.3 12.1]	10.0212 [4.8 15.3]	23.7980 [14.6 29.5]	25.0950 [14.7 29.9]	22.7661 [13.2 28.3]
Country:	**DE**				**FR**			
Consumer Confidence	32.5761 [23.1 40.5]	9.9959 [6.0 15.0]	9.7174 [6.1 14.8]	9.3430 [5.3 13.5]	46.6457 [38.5 52.4]	35.3735 [23.6 41.7]	28.2163 [18.7 33.4]	22.1819 [13.2 22.8]
Private Consumption	21.8813 [15.9 29.5]	19.1788 [12.9 25.5]	18.9597 [12.8 25.0]	18.4458 [11.9 23.7]	21.3822 [14.7 28.1]	18.7630 [12.6 24.2]	18.2584 [12.3 23.3]	17.5034 [11.6 22.2]
Real Interest Rate	52.9876 [43.8 60.7]	36.8719 [27.6 41.8]	30.7300 [22.1 34.9]	20.0378 [11.0 24.2]	36.7008 [27.7 43.0]	23.8113 [16.7 27.8]	18.2248 [12.8 22.3]	20.1227 [9.5 23.8]
Unemployment Rate	3.8567 [1.1 7.7]	1.8309 [053 5.3]	0.7680 [0.7 4.2]	2.6163 [1.2 7.7]	0.8591 [0.1 3.2]	5.4060 [1.8 9.9]	2.3447 [1.2 6.3]	3.2272 [2.0 9.8]
Real GDP	8.0328 [4.3 13.1]	9.0993 [6.1 14.8]	10.3569 [6.9 15.9]	10.2272 [6.6 14.9]	0.9490 [0.1 3.0]	2.1717 [1.4 6.3]	5.0096 [2.6 10.6]	4.8870 [3.1 11.0]
Country:	**IT**				**EA**			
Consumer Confidence	41.7993 [33.1 49.3]	34.6735 [23.1 42.0]	29.4829 [17.6 36.9]	19.6164 [11.4 27.3]	26.2285 [19.6 32.9]	12.2010 [6.5 18.3]	10.1793 [5.1 15.7]	7.8133 [4.4 14.1]
Private Consumption	24.1080 [16.8 30.2]	20.5880 [14.0 25.5]	20.0499 [13.8 25.0]	18.4476 [12.1 22.8]	11.2750 [7.1 16.0]	8.4327 [5.5 12.7]	7.8538 [5.3 12.7]	8.2030 [5.7 12.7]
Real Interest Rate	22.6416 [16.0 28.9]	21.5826 [13.2 29.3]	16.5169 [9.7 25.0	7.8515 [4.8 16.9]	19.5812 [14.3 23.8]	12.7736 [9.1 16.9]	8.6092 [6.5 12.8]	11.0829 [4.5 18.8]
Unemployment Rate	0.0128 [0.0 2.0]	0.3513 [0.5 4.2]	1.3019 [0.7 7.7]	1.2316 [1.0 10.5]	0.3820 [0.1 2.4]	0.6902 [0.2 3.5]	0.9827 [0.3 4.7]	1.0055 [1.4 9.7]
Real GDP	2.1113 [0.4 5.0]	1.8958 [1.6 6.0]	1.8536 [2.0 7.3]	1.7559 [2.4 7.6]	0.0059 [0.0 1.1]	2.1871 [1.4 6.1]	2.1052 [1.8 6.4]	2.2748 [2.4 7.4]

Note: Numbers correspond to the point estimates of the FEV shares at horizon h conditional on data for 1985Q1-2011Q4, while numbers in brackets correspond to the pointwise 16th and 84th percentiles based on 500 draws from the Normal-Wishart posterior of the reduced-form parameters.

Table 4.a: Percent contribution of consumer confidence shocks to the FEVD of foreign variables based on FAVAR model in (5) and (6)

Origin:	US				**Origin:**	UK			
Horizon:	$h=1$	$h=4$	$h=8$	$h=40$	**Horizon:**	$h=1$	$h=4$	$h=8$	$h=40$
UK Confidence	0.4533 [0.1 7.2]	12.9642 [6.3 21.4]	15.2851 [7.0 24.8]	9.6183 [4.8 17.4]	*US* Confidence	20.8636 [14.7 34.6]	33.7277 [23.6 42.3]	36.1113 [22.8 43.4]	26.8563 [14.8 34.0]
UK Consumption	13.2194 [4.5 30.1]	31.9445 [19.0 40.1]	30.5184 [17.7 37.1]	18.9840 [10.5 26.3]	*US* Consumption	2.7088 [0.7 13.4]	20.5999 [12.1 29.7]	19.8739 [11.0 27.8]	14.2579 [9.2 23.7]
UK Real GDP	2.2535 [0.6 13.6]	17.9105 [10.3 28.1]	18.2889 [10.1 27.2]	15.2488 [8.2 23.3]	*US* Real GDP	0.0596 [0.1 3.5]	18.6308 [11.1 26.0]	17.9077 [9.9 24.7]	15.1611 [8.7 23.0]
DE Confidence	6.1819 [0.3 13.7]	17.0741 [7.0 23.2]	19.8594 [8.5 28.4]	19.1990 [7.0 25.2]	*DE* Confidence	5.8720 [1.0 10.2]	2.9956 [1.8 7.3]	5.5971 [2.3 13.1]	8.0446 [3.9 19.3]
DE Consumption	11.3889 [0.7 20.0]	11.4098 [3.6 19.8]	10.7856 [4.5 18.2]	9.3824 [4.7 16.9]	*DE* Consumption	29.3455 [12.3 36.0]	20.3114 [8.9 26.3]	18.7333 [8.9 25.0]	17.5812 [9.0 23.7]
DE Real GDP	14.8095 [4.7 18.1]	13.4323 [6.4 17.9]	15.3439 [7.6 20.7]	15.0494 [7.3 19.4]	*DE* Real GDP	13.9339 [5.1 17.5]	11.5357 [6.4 15.8]	14.8161 [7.6 19.7]	15.0382 [8.3 20.3]
FR Confidence	6.8825 [0.4 14.1]	24.8211 [11.9 30.4]	28.2339 [13.5 34.5]	17.6461 [7.3 24.1]	*FR* Confidence	0.0757 [0.0 2.8]	10.2895 [4.8 18.1]	20.7444 [9.2 29.0]	22.1780 [9.7 29.5]
FR Consumption	0.0703 [0.1 7.2]	9.6175 [4.5 20.5]	13.3534 [5.9 24.0]	11.5402 [5.1 21.2]	*FR* Consumption	0.2894 [0.1 5.1]	12.4678 [6.4 21.5]	19.5526 [8.8 26.6]	19.0535 [8.9 25.8]
FR Real GDP	0.3994 [0.0 1.6]	12.7591 [5.8 20.3]	16.7957 [8.0 24.2]	14.6359 [6.8 21.9]	*FR* Real GDP	2.0096 [0.1 3.1]	14.7391 [8.5 21.4]	20.1839 [10.2 27.1]	18.9674 [9.9 25.7]
IT Confidence	34.2569 [11.2 49.6]	38.5260 [20.6 45.4]	36.1771 [18.2 43.2]	18.9332 [9.2 27.2]	*IT* Confidence	9.6392 [3.3 29.1]	26.1551 [15.5 35.4]	33.5191 [18.5 41.0]	31.7770 [14.5 35.9]
IT Consumption	5.4839 [1.5 19.3]	12.5100 [5.5 23.4]	14.8965 [6.6 25.1]	12.6494 [6.5 22.0]	*IT* Consumption	0.0300 [0.1 5.6]	13.1951 [7.1 22.0]	19.7135 [9.1 28.0]	18.3195 [9.3 25.3]
IT Real GDP	0.9174 [0.1 2.8]	13.8976 [7.0 21.1]	16.6316 [8.2 24.1]	14.4903 [7.1 21.2]	*IT* Real GDP	0.1173 [0.0 2.4]	15.3838 [8.8 22.6]	20.8443 [10.4 27.1]	19.5590 [10.3 25.7]
EA Confidence	21.9683 [8.4 32.0]	30.0551 [17.5 37.6]	31.1171 [16.3 39.7]	21.5592 [10.1 27.4]	*EA* Confidence	0.0663 [0.0 3.1]	11.8223 [5.5 20.4]	21.4403 [9.1 30.8]	23.6805 [9.7 28.9]
EA Consumption	2.8407 [0.1 3.9]	6.6231 [2.7 12.5]	10.3677 [4.2 17.5]	8.6755 [4.1 16.1]	*EA* Consumption	3.7129 [0.3 5.8]	11.6349 [6.1 18.1]	18.0327 [8.3 25.4]	17.6623 [8.2 24.9]
EA Real GDP	5.0966 [0.6 5.9]	10.0381 [4.7 16.0]	13.7776 [6.2 21.4]	12.4710 [6.0 19.1]	*EA* Real GDP	4.3530 [0.7 6.0]	12.6198 [7.1 18.8]	18.3207 [8.9 24.8]	17.3764 [8.9 24.3]

Note: Numbers correspond to the point estimates of the FEV shares at horizon h conditional on data for 1985Q1-2011Q4, while numbers in brackets correspond to the pointwise 16th and 84th percentiles based on 500 joint draws from the Normal-Wishart posterior for (5) and the Normal-Gamma posterior for (6).

Table 4.b: Percent contribution of consumer confidence shocks to the FEVD of foreign variables based on FAVAR model in (5) and (6)

Origin:	**DE**				**Origin:**	**FR**			
Horizon:	$h = 1$	$h = 4$	$h = 8$	$h = 40$	**Horizon:**	$h = 1$	$h = 4$	$h = 8$	$h = 40$
US Confidence	2.3237 [0.6 7.6]	2.8629 [2.3 7.7]	2.5436 [2.1 6.7]	2.4149 [2.1 7.0]	*US* Confidence	7.6900 [4.7 17.2]	8.0380 [5.3 15.5]	6.8169 [4.9 14.1]	5.1120 [4.3 12.0]
US Consumption	0.0103 [0.1 6.6]	1.4345 [1.4 7.3]	1.6282 [1.5 7.0]	2.3866 [2.0 7.3]	*US* Consumption	0.7912 [0.1 4.7]	1.1207 [1.0 6.0]	0.9003 [1.3 6.7]	1.7958 [2.3 8.3]
US Real GDP	0.2482 [0.1 5.5]	2.0492 [1.5 8.0]	2.3325 [1.9 7.8]	2.7775 [2.4 7.7]	*US* Real GDP	1.8403 [0.1 5.5]	1.1024 [1.1 6.9]	1.2188 [1.5 7.9]	1.9215 [2.4 9.4]
UK Confidence	5.9766 [1.8 13.6]	5.9532 [2.8 11.5]	4.4791 [2.5 9.2]	4.0065 [2.4 8.5]	*UK* Confidence	0.0000 [0.1 2.9]	0.2131 [0.7 4.2]	0.2282 [1.1 5.7]	3.5636 [2.4 9.9]
UK Consumption	11.6652 [2.2 18.6]	7.6780 [3.4 12.7]	6.0842 [3.1 11.0]	4.9921 [2.7 9.3]	*UK* Consumption	0.8546 [0.2 5.9]	0.7114 [1.1 6.6]	0.6566 [1.4 7.7]	1.0995 [2.4 8.8]
UK Real GDP	0.1454 [0.1 4.5]	2.0113 [1.4 6.9]	2.3212 [1.6 7.4]	2.6892 [2.1 7.7]	*UK* Real GDP	0.0013 [0.1 3.7]	0.3368 [0.9 5.5]	0.6419 [1.4 7.0]	1.3253 [2.2 8.6]
FR Confidence	25.3351 [15.0 37.6]	11.1830 [6.8 16.8]	10.6266 [6.7 16.4]	7.7505 [4.5 12.0]	*DE* Confidence	0.4971 [0.4 9.7]	2.5609 [2.4 10.4]	6.3657 [4.1 12.6]	8.4809 [4.4 14.7]
FR Consumption	0.1706 [0.2 7.4]	2.3015 [1.9 8.6]	3.3058 [2.4 9.7]	2.7249 [2.4 8.7]	*DE* Consumption	0.9297 [0.5 16.2]	3.8414 [3.3 16.1]	8.2725 [5.2 18.2]	13.6017 [6.6 20.1]
FR Real GDP	1.1741 [0.1 3.2]	3.0911 [1.3 7.1]	4.5463 [1.9 9.6]	4.2217 [2.2 8.9]	*DE* Real GDP	4.9383 [0.4 12.3]	4.4627 1.8 9.9]	8.8508 [3.8 14.2]	9.7141 [4.9 15.8]
IT Confidence	6.3327 [1.2 16.7]	5.0391 [3.5 12.1]	5.3647 [3.9 11.8]	4.2917 [3.0 9.5]	*IT* Confidence	2.6814 [0.8 16.0]	6.1031 [2.9 15.5]	5.9757 [4.0 14.7]	5.9119 [4.2 14.6]
IT Consumption	5.4913 [0.2 11.6]	4.6174 [1.8 9.9]	5.7371 [2.4 10.9]	4.6611 [2.2 9.4]	*IT* Consumption	13.3821 [1.2 16.7]	12.2030 [3.5 16.9]	14.5184 [5.3 19.2]	14.0254 [5.5 18.4]
IT Real GDP	0.9083 [0.2 5.2]	2.7491 [1.6 7.5]	4.3664 [2.2 9.7]	3.9781 [2.3 9.1]	*IT* Real GDP	10.1877 [1.4 12.9]	5.7020 [2.1 9.6]	8.2217 [3.4 13.4]	7.9628 [4.1 13.4]
EA Confidence	23.3019 [16.6 33.3]	9.3925 [6.4 14.0]	9.7339 [6.4 14.7]	7.8557 [4.8 11.9]	*EA* Confidence	10.6353 [8.2 22.9]	11.8327 [8.2 19.8]	11.0031 [8.1 17.5]	9.8762 [6.9 16.6]
EA Consumption	10.0949 [6.6 19.6]	9.9470 [7.1 16.2]	10.4841 [7.7 16.5]	8.9109 [5.7 13.9]	*EA* Consumption	2.3779 [1.0 8.8]	3.4776 [2.3 9.6]	6.3229 [3.5 12.9]	7.8283 [4.5 13.9]
EA Real GDP	3.2804 [1.3 7.6]	4.9624 [3.2 10.1]	6.4981 [3.9 11.5]	6.1037 [3.6 10.9]	*EA* Real GDP	1.5097 [0.1 3.7]	2.7486 [1.0 6.7]	6.0295 [2.3 11.2]	6.0739 [3.0 12.81

Note: Numbers correspond to the point estimates of the FEV shares at horizon h conditional on data for 1985Q1-2011Q4, while numbers in brackets correspond to the pointwise 16th and 84th percentiles based on 500 joint draws from the Normal-Wishart posterior for (5) and the Normal-Gamma posterior for (6).

Table 4.c: Percent contribution of consumer confidence shocks to the FEVD of foreign variables based on FAVAR model in (5) and (6)

Origin:	**IT**				**Origin:**	**EA**			
Horizon:	$h = 1$	$h = 4$	$h = 8$	$h = 40$	**Horizon:**	$h = 1$	$h = 4$	$h = 8$	$h = 40$
US Confidence	3.9544 [0.9 11.2]	14.2965 [6.5 22.5]	14.8787 [6.4 23.5]	7.3512 [4.7 14.9]	*US* Confidence	5.7035 [3.4 13.7]	14.5603 [7.1 21.7]	14.6451 [6.3 21.5]	9.9736 [4.9 16.0]
US Consumption	0.1273 [0.1 4.1]	4.3581 [1.9 12.0]	4.4246 [2.3 12.1]	2.9734 [2.7 10.5]	*US* Consumption	4.9910 [0.1 5.1]	6.5263 [1.7 10.5]	7.7874 [2.2 12.0]	5.7019 [2.9 11.0]
US Real GDP	0.3190 [0.1 6.2]	5.0732 [1.7 12.6]	5.4403 [2.5 13.5]	3.5713 [2.9 11.9]	*US* Real GDP	6.2858 [0.2 6.8]	4.4899 [1.3 7.0]	5.1761 [1.6 8.5]	4.0385 [2.4 9.8]
UK Confidence	21.4076 [7.0 25.5]	15.1919 [5.7 29.1]	13.8134 [5.6 18.8]	8.6668 [4.6 14.8]	*UK* Confidence	2.2210 [0.1 4.3]	5.5243 [1.4 10.7]	7.4609 [2.1 13.7]	9.2199 [3.8 15.2]
UK Consumption	1.4882 [0.3 10.4]	13.8821 [5.3 23.2]	14.8509 [6.1 25.1]	9.2432 [5.1 17.5]	*UK* Consumption	3.8917 [0.1 4.3]	5.3653 [1.9 9.7]	5.1404 [2.0 10.8]	4.0011 [2.7 10.4]
UK Real GDP	0.7415 [0.1 3.6]	5.3324 [2.1 10.9]	5.9997 [2.5 12.6]	4.2605 [3.1 11.4]	*UK* Real GDP	2.8511 [0.1 3.8]	2.3647 [0.9 6.0]	2.3258 [1.3 7.2]	1.6281 [2.0 8.3]
DE Confidence	1.2668 [0.1 6.5]	0.6634 [0.9 5.8]	0.3773 [1.0 7.3]	0.4644 [1.5 9.7]	*DE* Confidence	7.1836 [3.9 22.2]	2.4382 [1.8 8.4]	1.9852 [2.0 8.1]	5.0335 [2.8 11.0]
DE Consumption	35.0204 [5.7 39.3]	23.8418 [5.9 28.5]	19.7988 [5.6 25.1]	16.8673 [4.9 21.7]	*DE* Consumption	16.5679 [7.5 21.8]	14.2977 [7.6 18.2]	14.2976 [7.7 17.9]	15.4898 [8.3 18.6]
DE Real GDP	8.1674 [0.7 11.4]	5.8268 [1.8 10.3]	5.4977 [2.4 11.7]	5.2764 [2.6 11.6]	*DE* Real GDP	0.0300 [0.0 2.8]	4.4061 [2.4 8.7]	4.3472 [2.7 9.3]	4.9715 [3.4 10.2]
FR Confidence	0.6013 [0.1 4.9]	2.3890 [1.6 7.9]	1.9495 [1.7 8.1]	1.5935 [2.0 9.4]	*FR* Confidence	33.0941 [9.7 34.6]	16.2078 [7.0 20.8]	13.9516 [5.5 19.0]	10.5278 [5.0 16.1]
FR Consumption	1.2967 [0.2 6.8]	6.5915 [3.7 14.5]	6.4502 [4.1 15.0]	5.5402 [4.2 13.6]	*FR* Consumption	9.7839 [5.2 17.8]	8.0576 [4.7 14.2]	7.3750 [4.6 13.3]	6.6239 [4.7 12.6]
FR Real GDP	0.3626 [0.0 1.7]	0.8915 [0.9 5.4]	1.0218 [1.3 7.7]	1.1098 [1.9 7.9]	*FR* Real GDP	0.7600 [0.0 1.6]	1.2440 [0.9 4.3]	1.2883 [1.4 5.3]	1.4587 [1.9 6.8]
EA Confidence	6.3689 [2.3 15.3]	8.0718 [4.5 15.2]	5.8868 [3.8 13.7]	4.5256 [3.8 13.0]	*IT* Confidence	28.1923 [13.8 47.1]	21.6649 [11.0 29.1]	17.8335 [8.4 24.1]	13.2879 [6.2 18.4]
EA Consumption	0.0277 [0.1 4.1]	1.0719 [1.2 7.4]	0.9779 [1.6 8.7]	1.1048 [2.2 9.6]	*IT* Consumption	0.1443 [0.2 8.2]	0.3682 [1.2 7.0]	0.6099 [1.6 7.4]	3.3349 [2.5 10.6]
EA Real GDP	2.1191 [0.1 3.0]	1.4796 [1.0 5.0]	1.4346 [1.4 6.7]	1.4136 [1.9 7.2]	*IT* Real GDP	3.9149 [0.1 4.2]	3.0296 [1.3 5.5]	2.8274 [1.8 6.5]	3.9896 [2.6 8.7]

Note: Numbers correspond to the point estimates of the FEV shares at horizon h conditional on data for 1985Q1-2011Q4, while numbers in brackets correspond to the pointwise 16th and 84th percentiles based on 500 joint draws from the Normal-Wishart posterior for (5) and the Normal-Gamma posterior for (6).

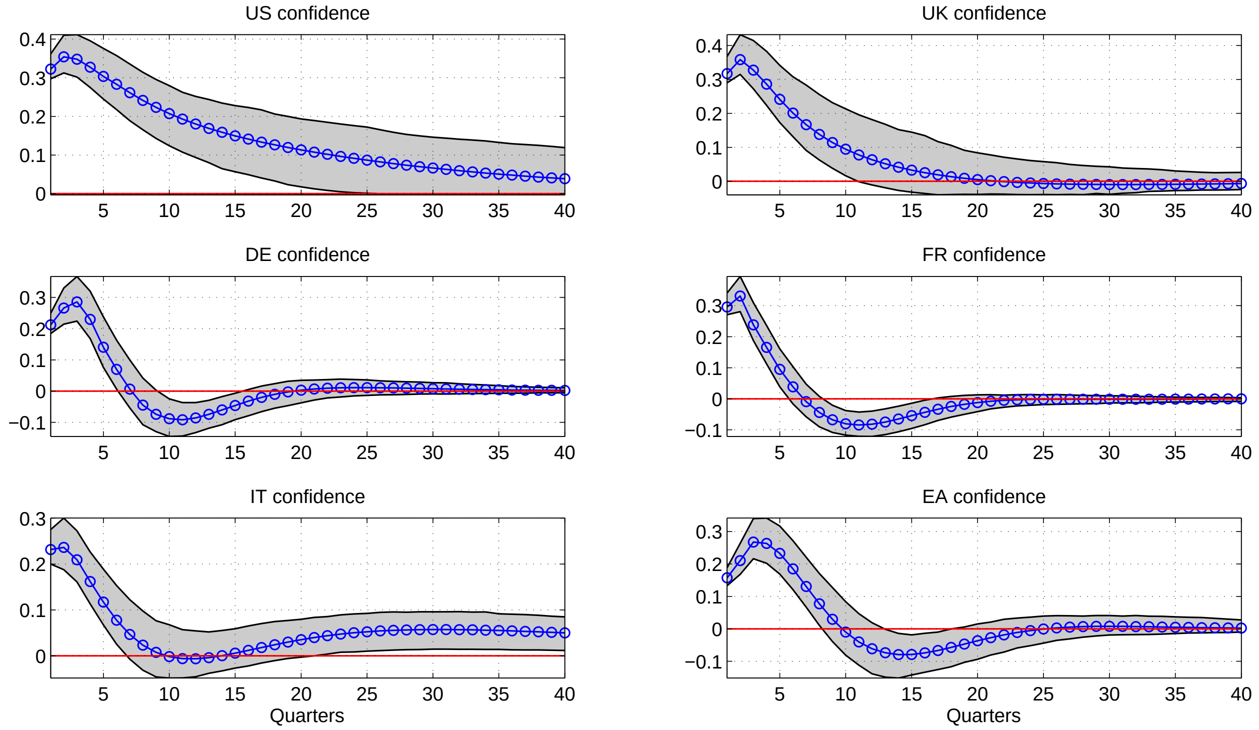

Figure 1: Impulse response functions of consumer confidence to a domestic structural confidence shock; point estimates with pointwise 16th and 84th percentiles based on the structural VAR in (1).

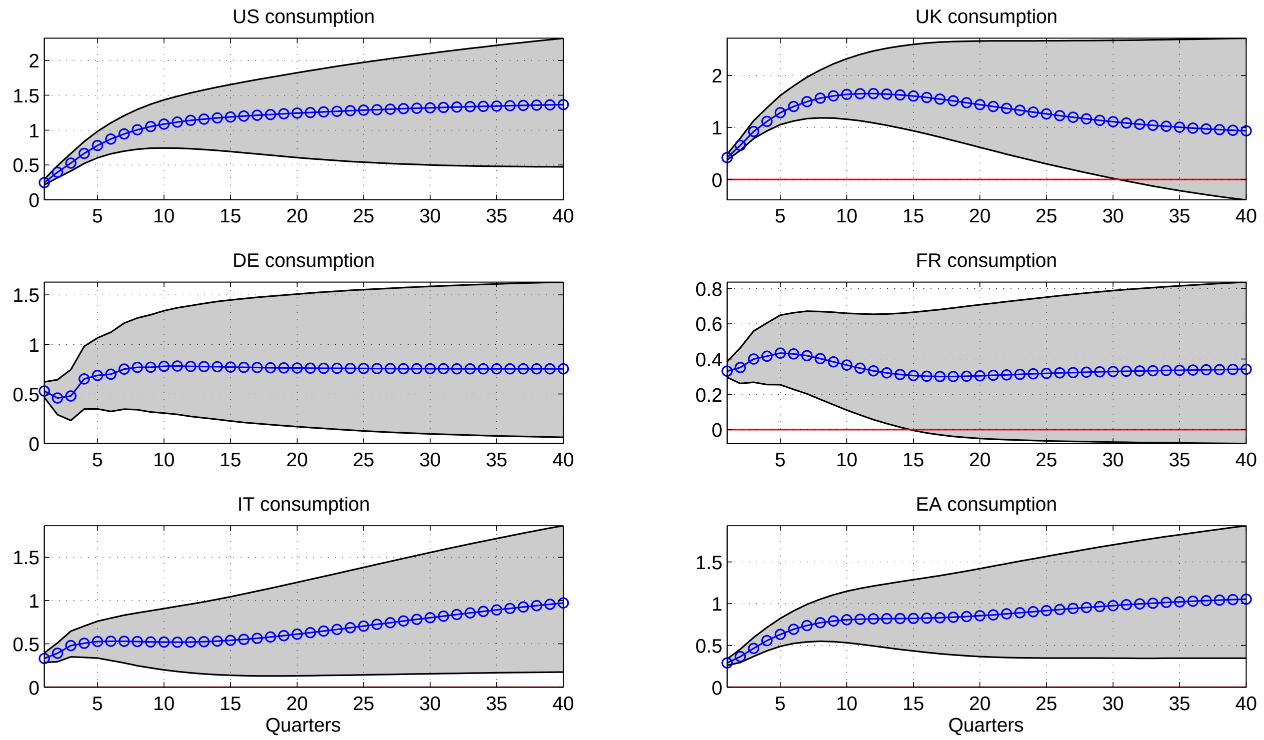

Figure 2: Impulse response functions of private consumption to a domestic structural confidence shock; point estimates with pointwise 16th and 84th percentiles based on the structural VAR in (1).

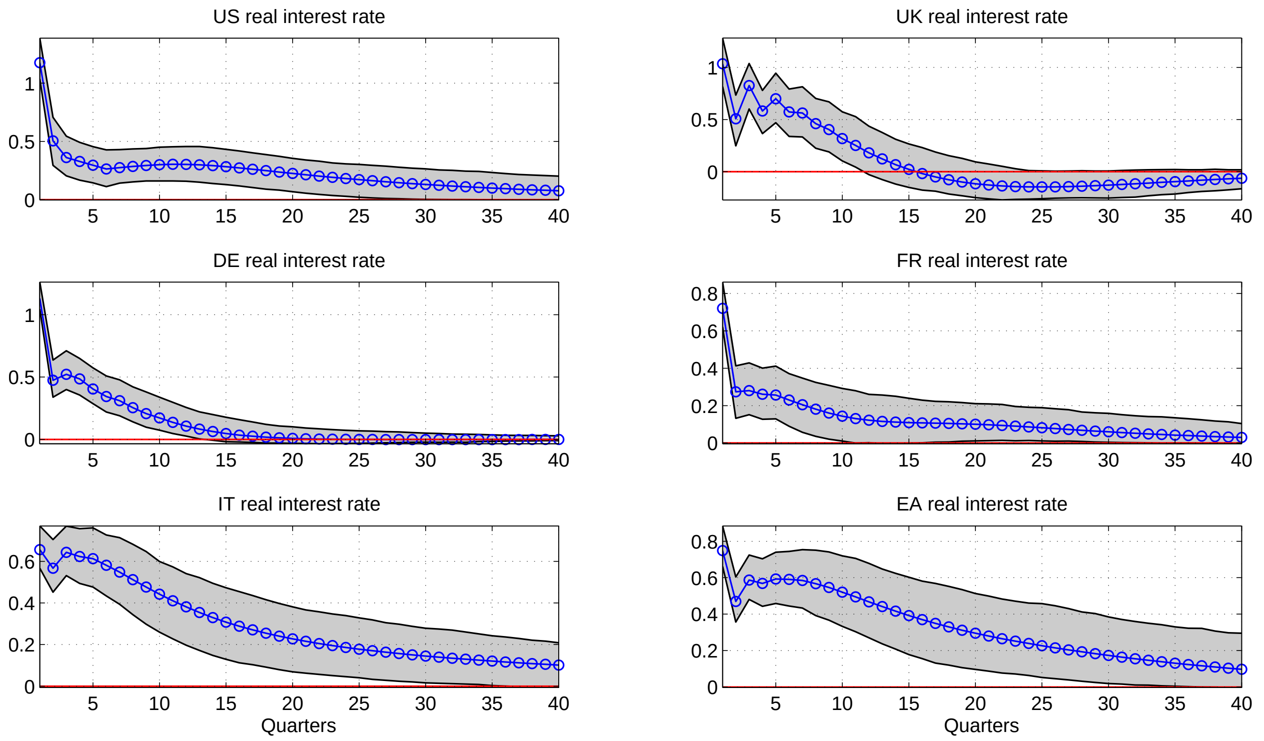

Figure 3: Impulse response functions of real interest rates to a domestic structural confidence shock; point estimates with pointwise 16th and 84th percentiles based on the structural VAR in (1).

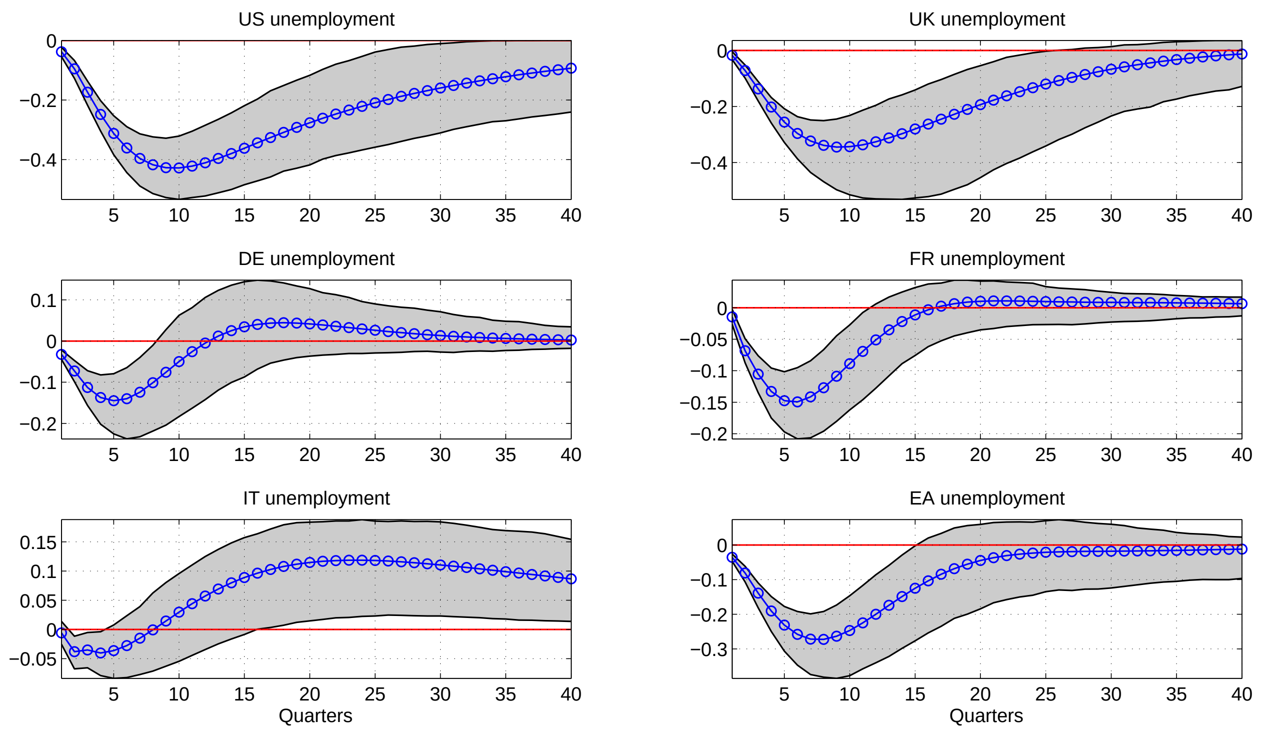

Figure 4: Impulse response functions of unemployment rates to a domestic structural confidence shock; point estimates with pointwise 16th and 84th percentiles based on the structural VAR in (1).

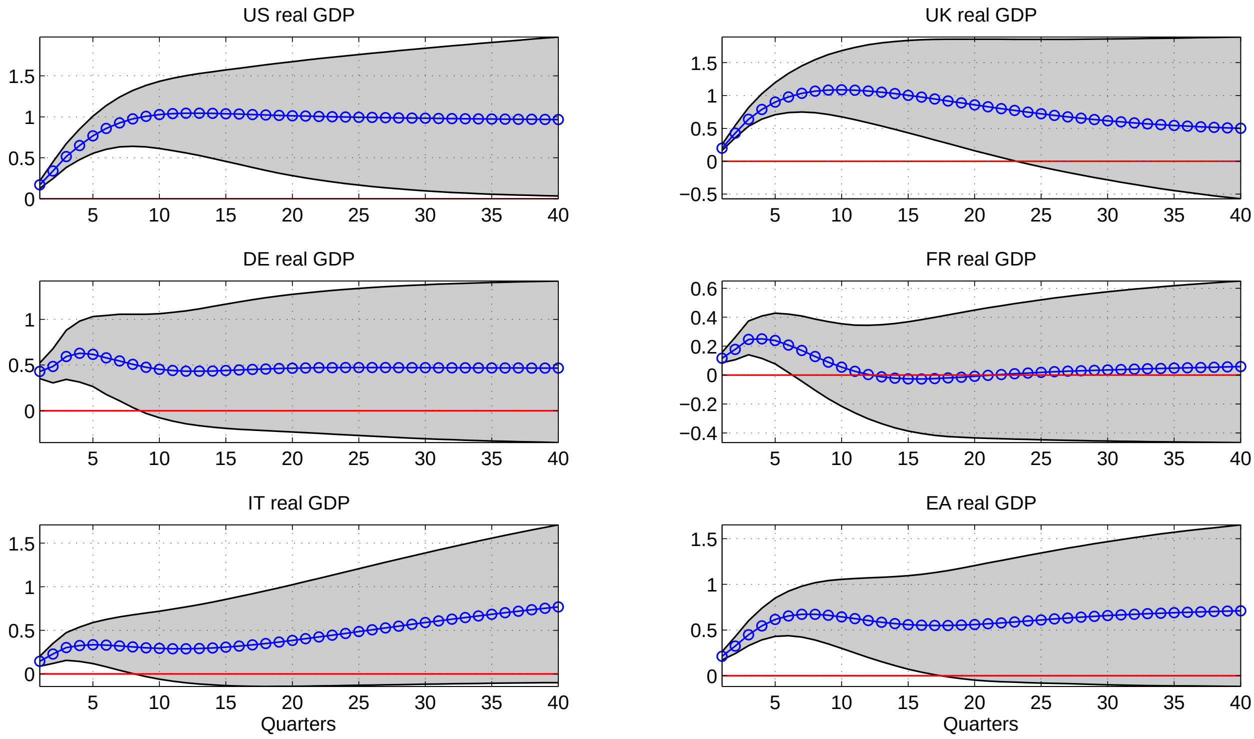

Figure 5: Impulse response functions of real GDP to a domestic structural confidence shock; point estimates with pointwise 16th and 84th percentiles based on the structural VAR in (1).

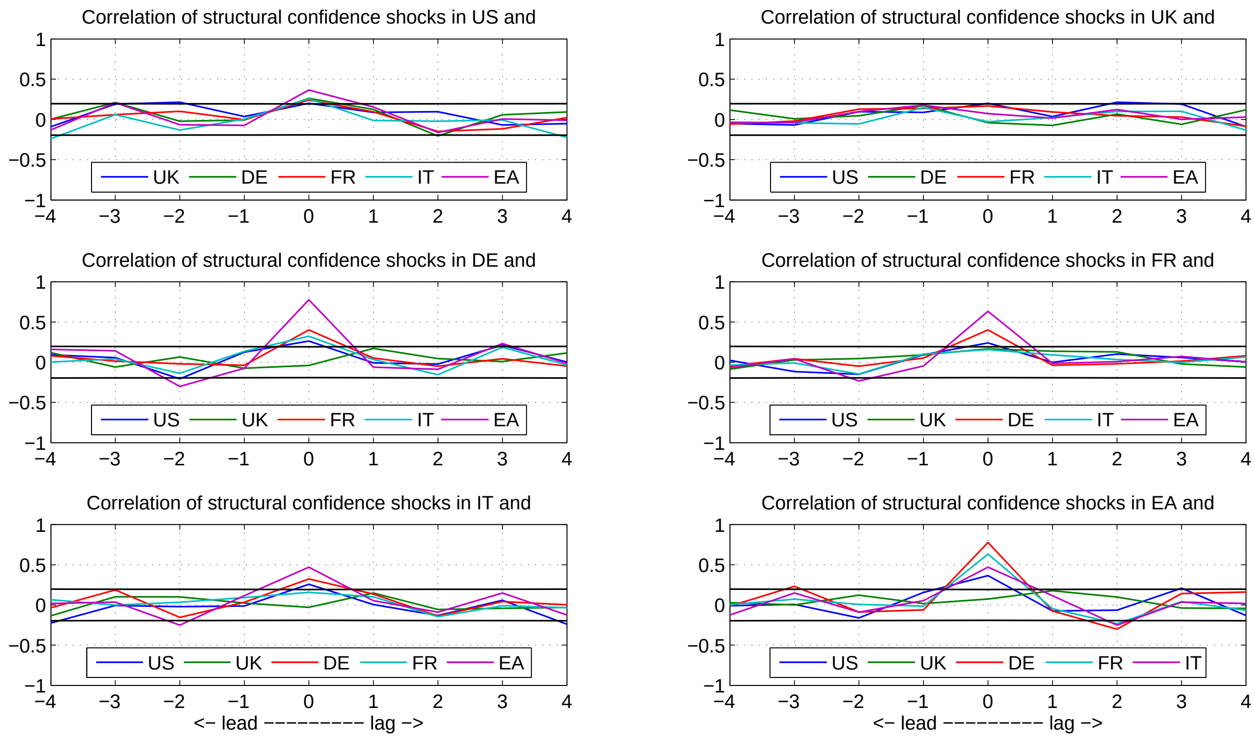

Figure 6: Lead and lag correlations of structural confidence shocks identified based on the VAR in (1).

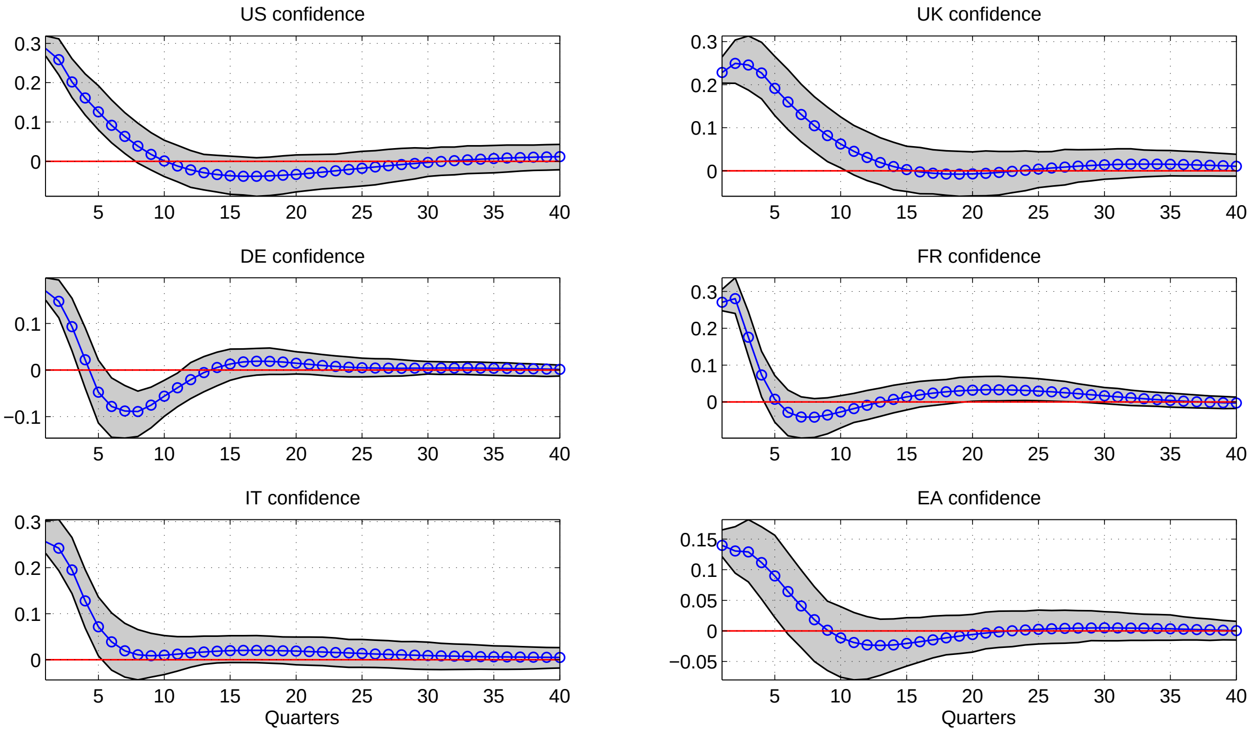

Figure 7: Impulse response functions of consumer confidence to a domestic structural confidence shock; point estimates with pointwise 16th and 84th percentiles based on the FAVAR in (5) and (6).

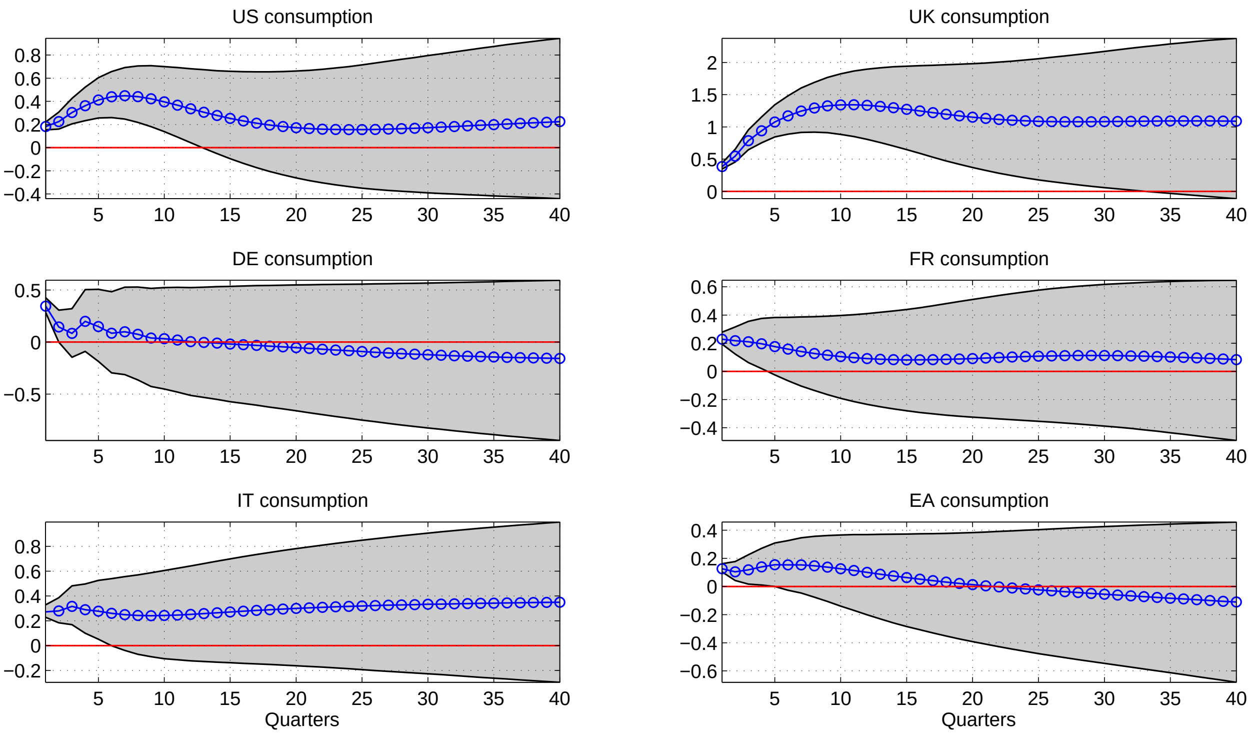

Figure 8: Impulse response functions of private consumption to a domestic structural confidence shock; point estimates with pointwise 16th and 84th percentiles based on the FAVAR in (5) and (6).

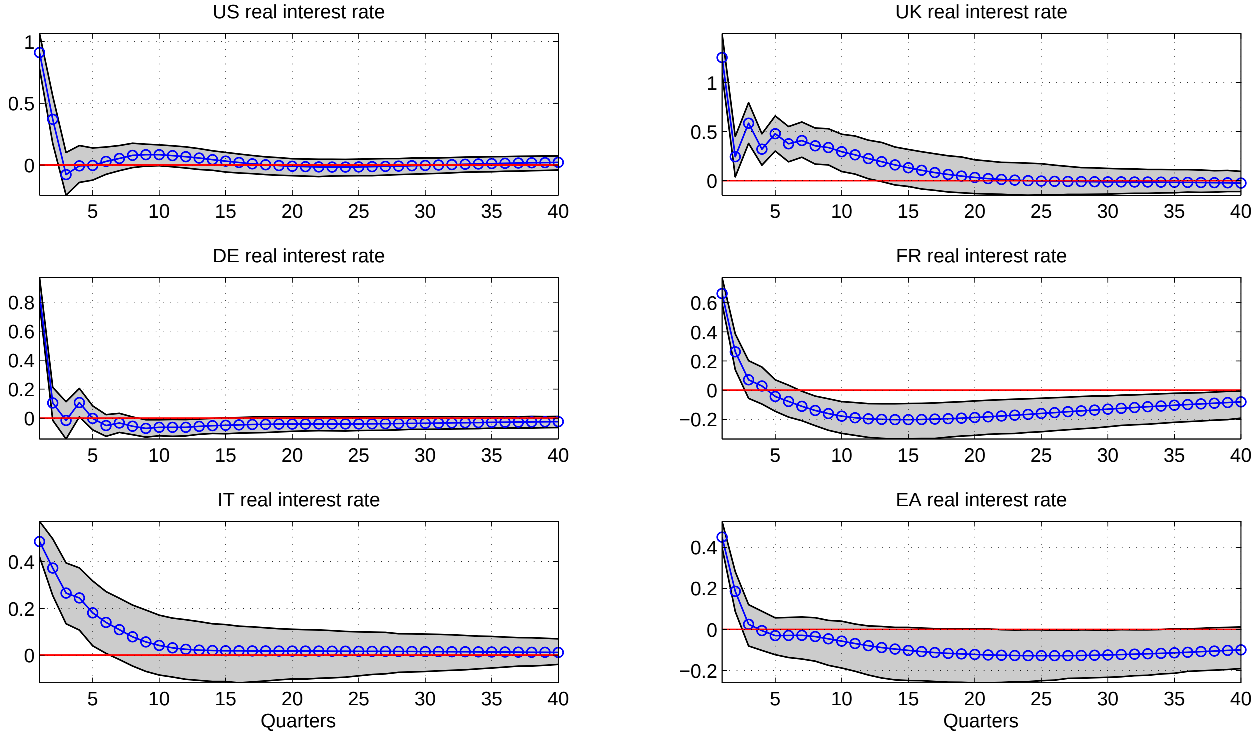

Figure 9: Impulse response functions of real interest rates to a domestic structural confidence shock; point estimates with pointwise 16th and 84th percentiles based on the FAVAR in (5) and (6).

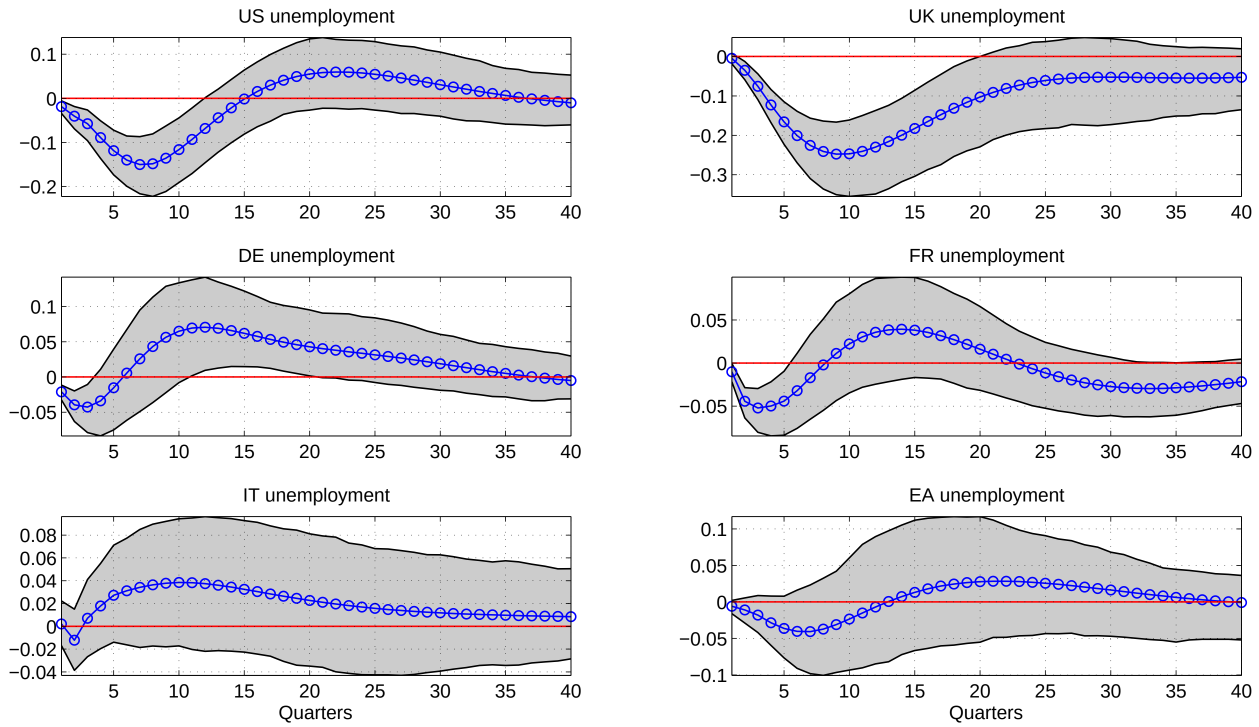

Figure 10: Impulse response functions of unemployment rates to a domestic structural confidence shock; point estimates with pointwise 16th and 84th percentiles based on the FAVAR in (5) and (6).

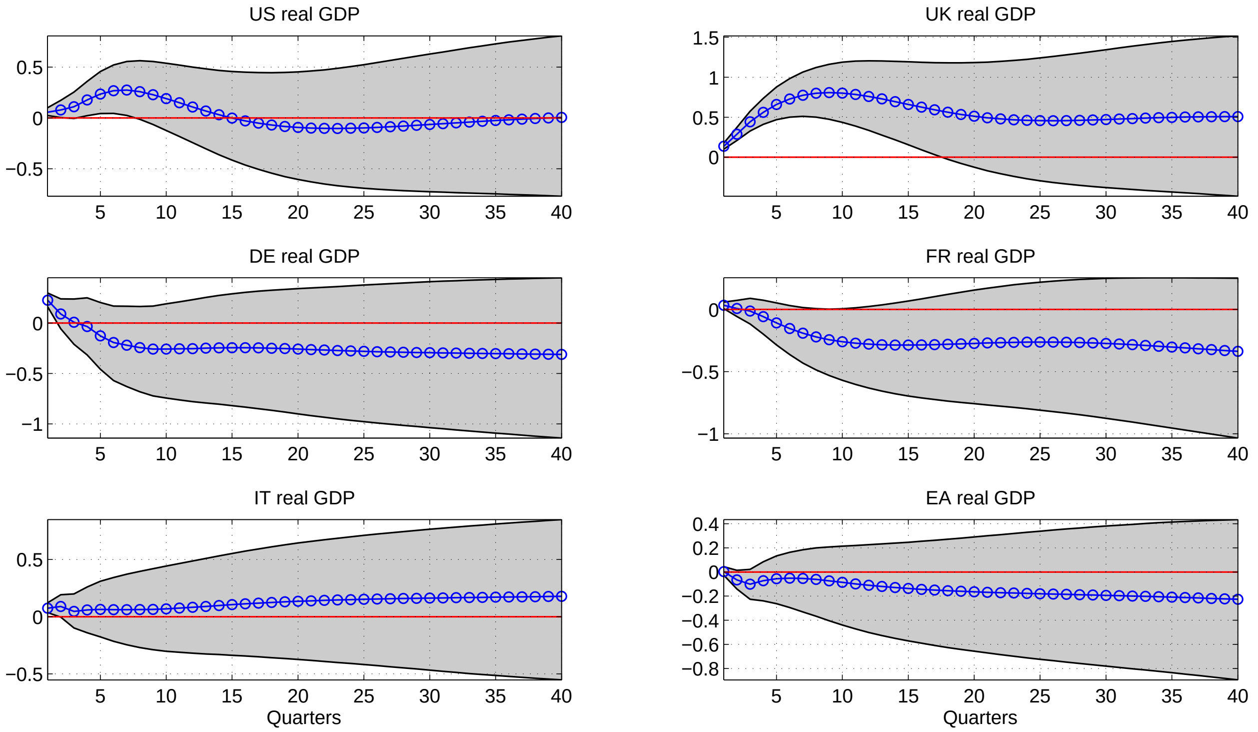

Figure 11: Impulse response functions of real GDP to a domestic structural confidence shock; point estimates with pointwise 16th and 84th percentiles based on the FAVAR in (5) and (6).

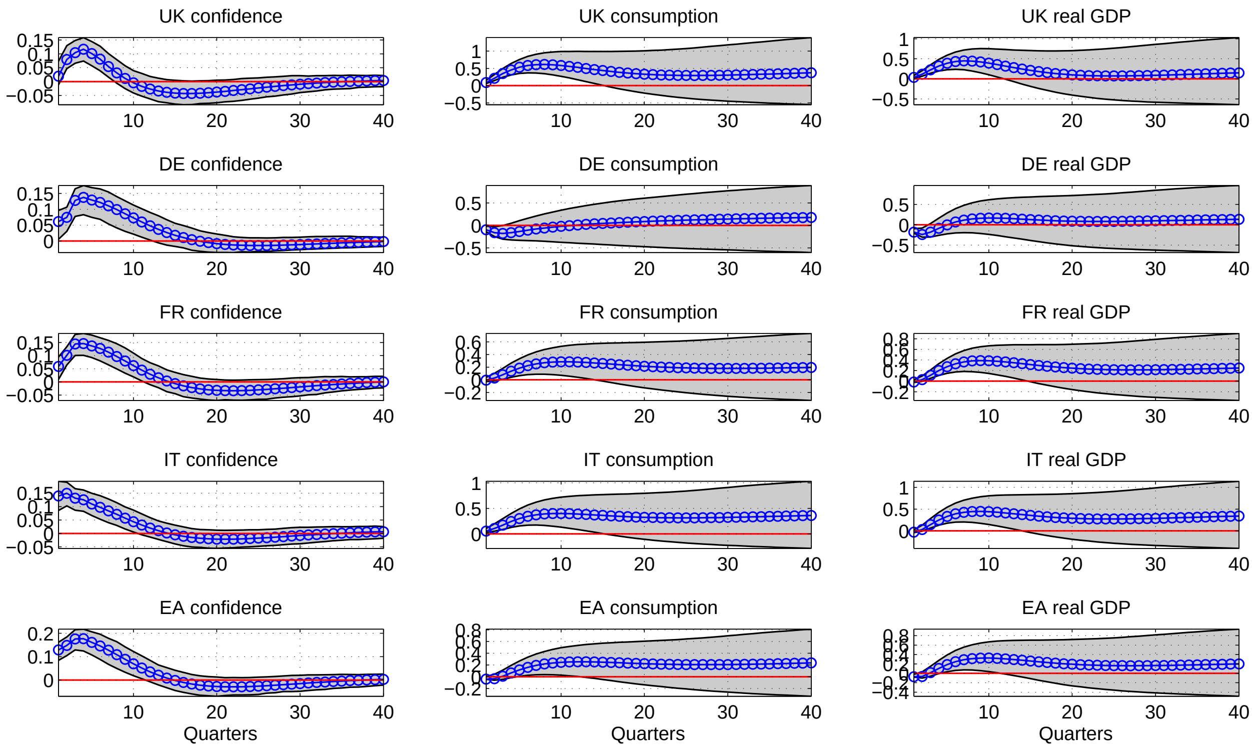

Figure 12: Impulse response functions of foreign variables to a *U.S.* structural confidence shock; point estimates with pointwise 16th and 84th percentiles based on the FAVAR in (5) and (6).

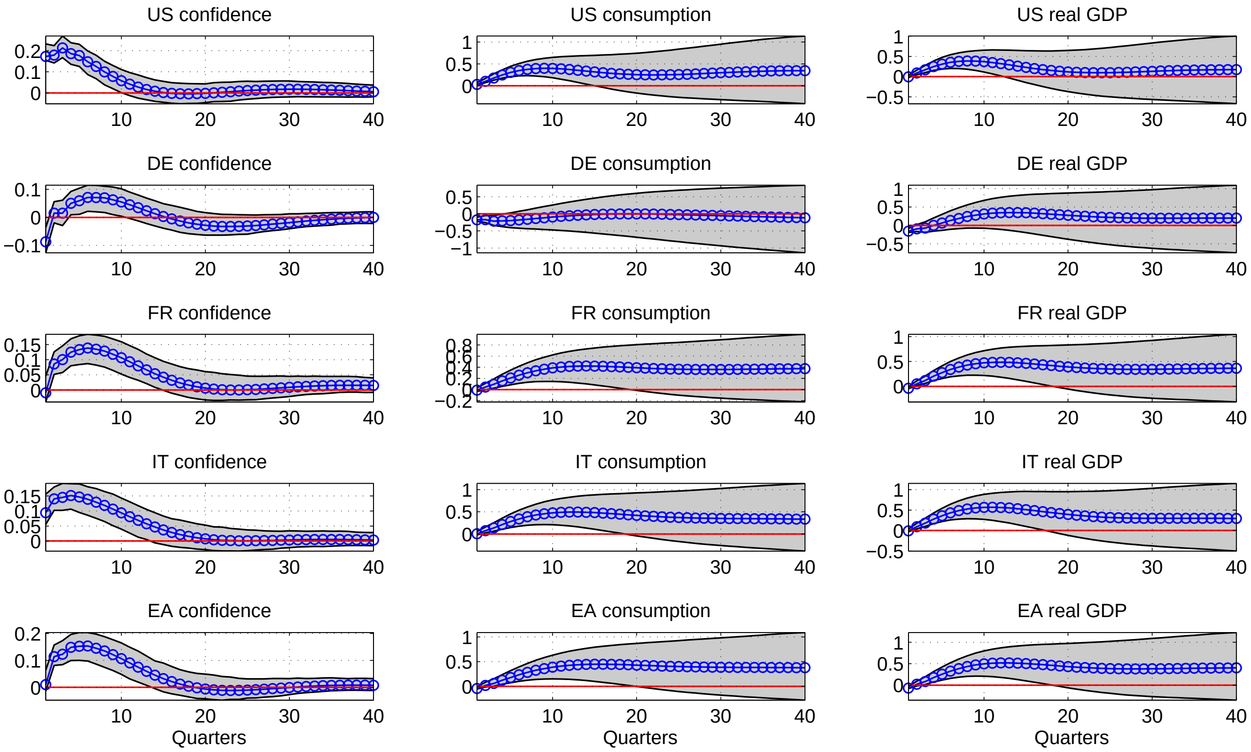

Figure 13: Impulse response functions of foreign variables to a *UK* structural confidence shock; point estimates with pointwise 16th and 84th percentiles based on the FAVAR in (5) and (6).

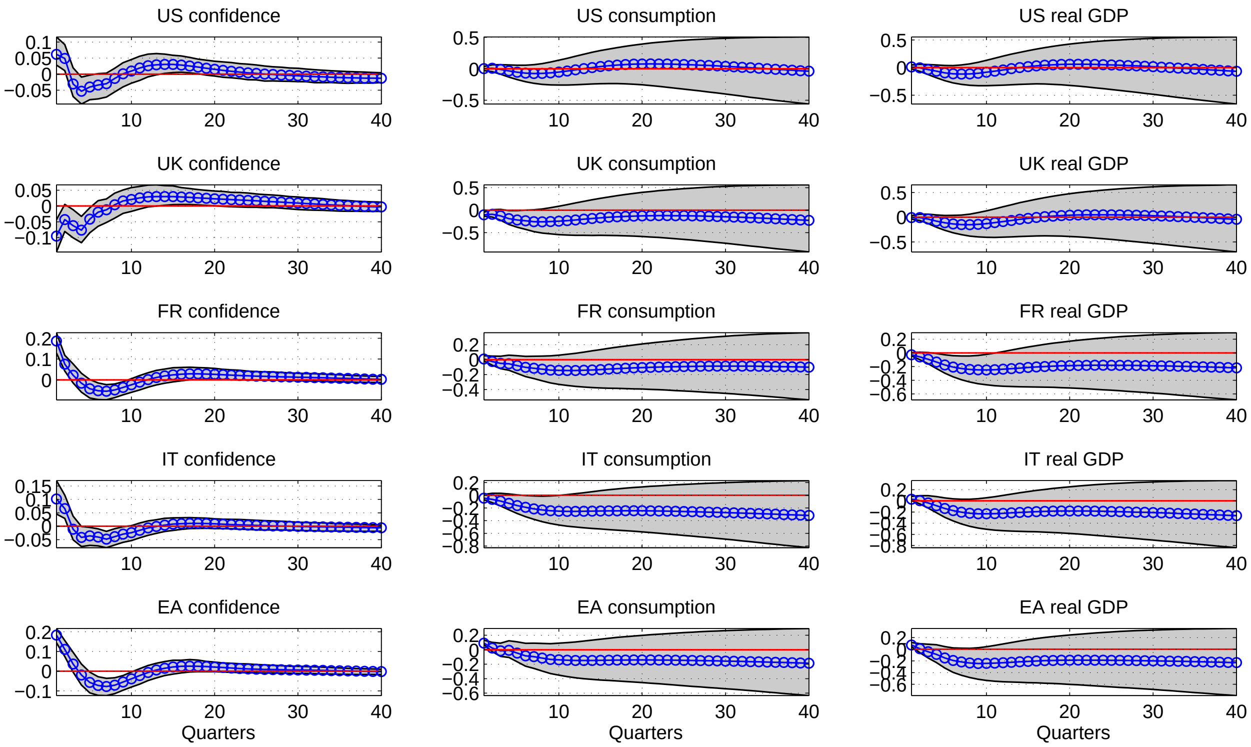

Figure 14: Impulse response functions of foreign variables to a *German* structural confidence shock; point estimates with pointwise 16th and 84th percentiles based on the FAVAR in (5) and (6).

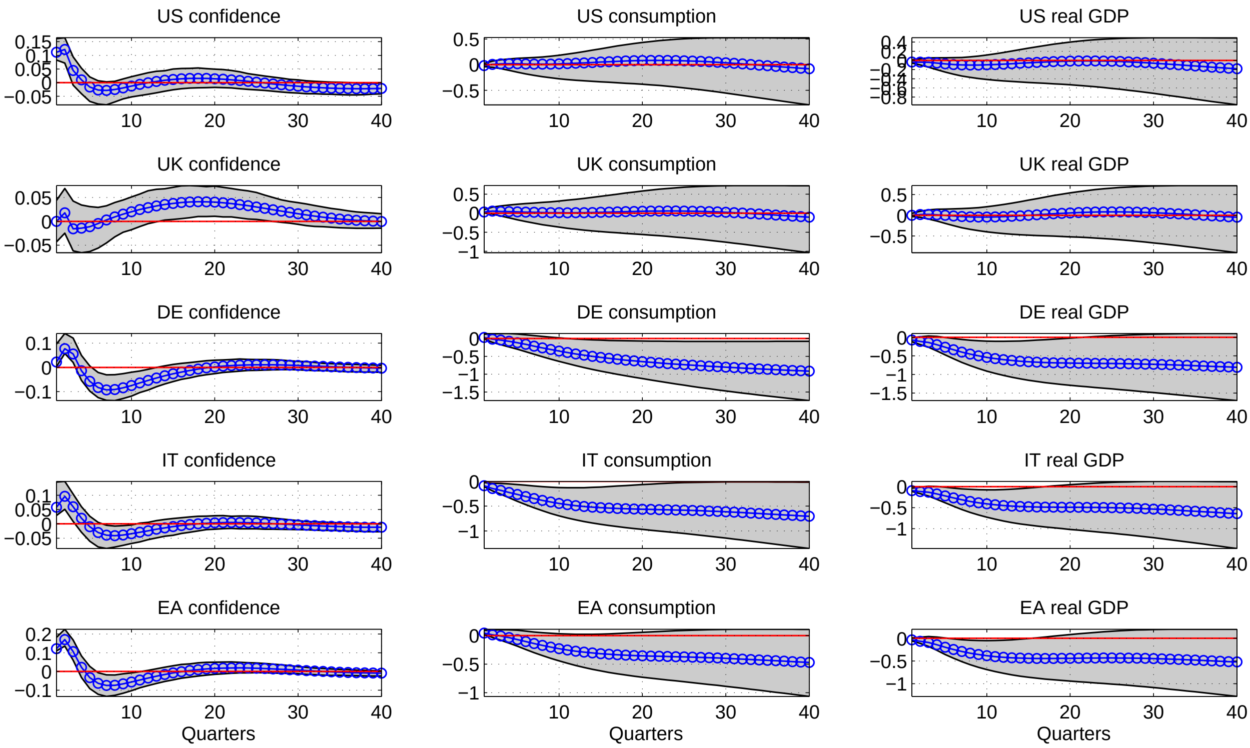

Figure 15: Impulse response functions of foreign variables to a *French* structural confidence shock; point estimates with pointwise 16th and 84th percentiles based on the FAVAR in (5) and (6).

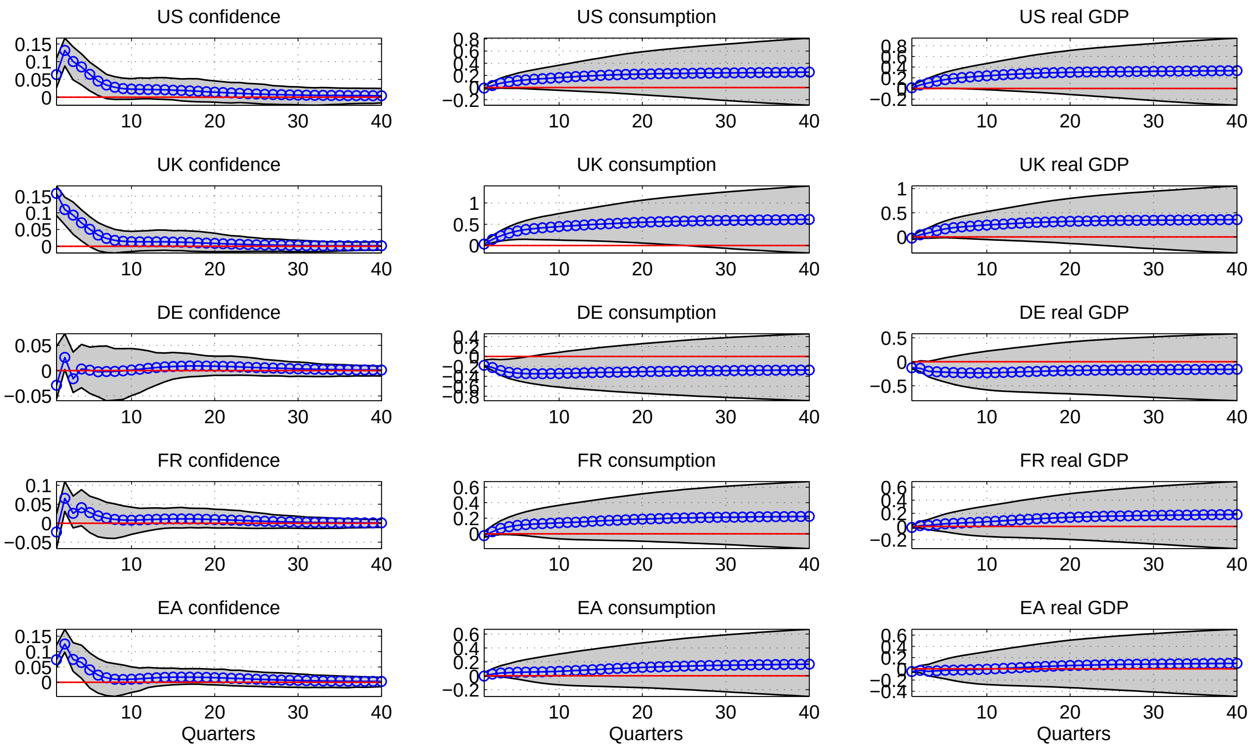

Figure 16: Impulse response functions of foreign variables to an *Italian* structural confidence shock; point estimates with pointwise 16th and 84th percentiles based on the FAVAR in (5) and (6).

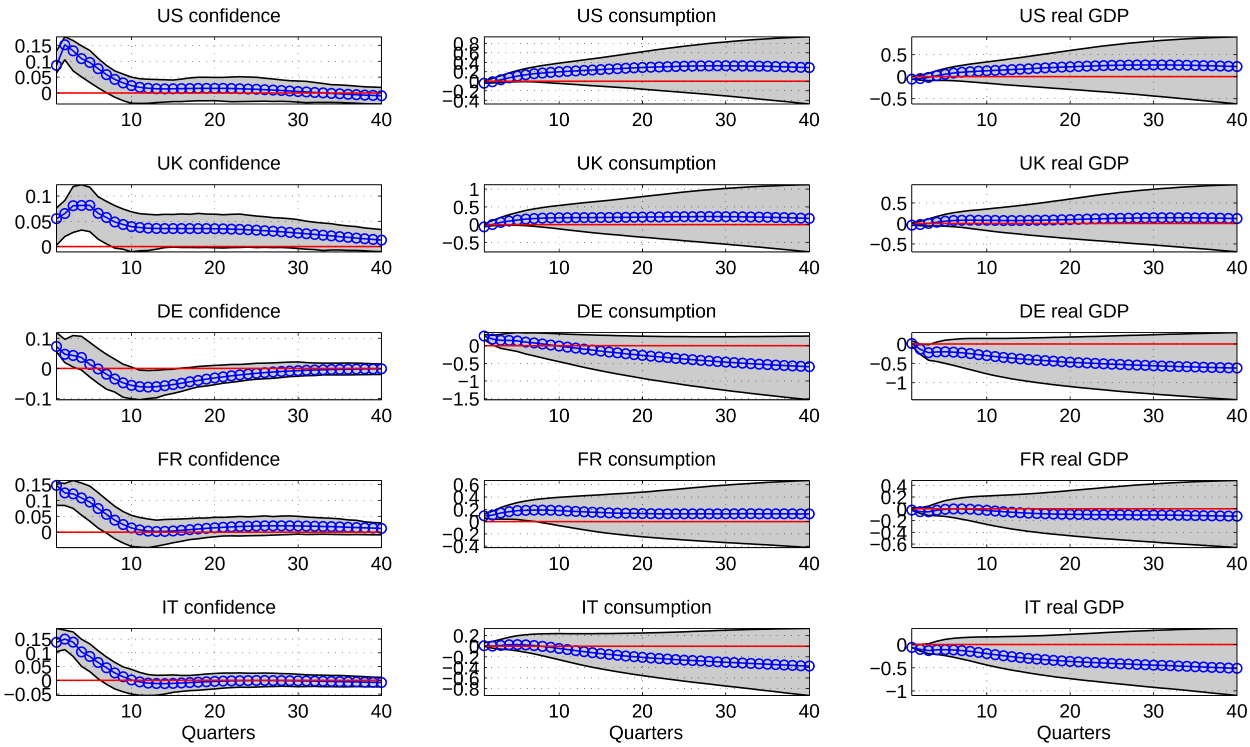

Figure 17: Impulse response functions of foreign variables to a *Euro Area* structural confidence shock; point estimates with pointwise 16th and 84th percentiles based on the FAVAR in (5) and (6).

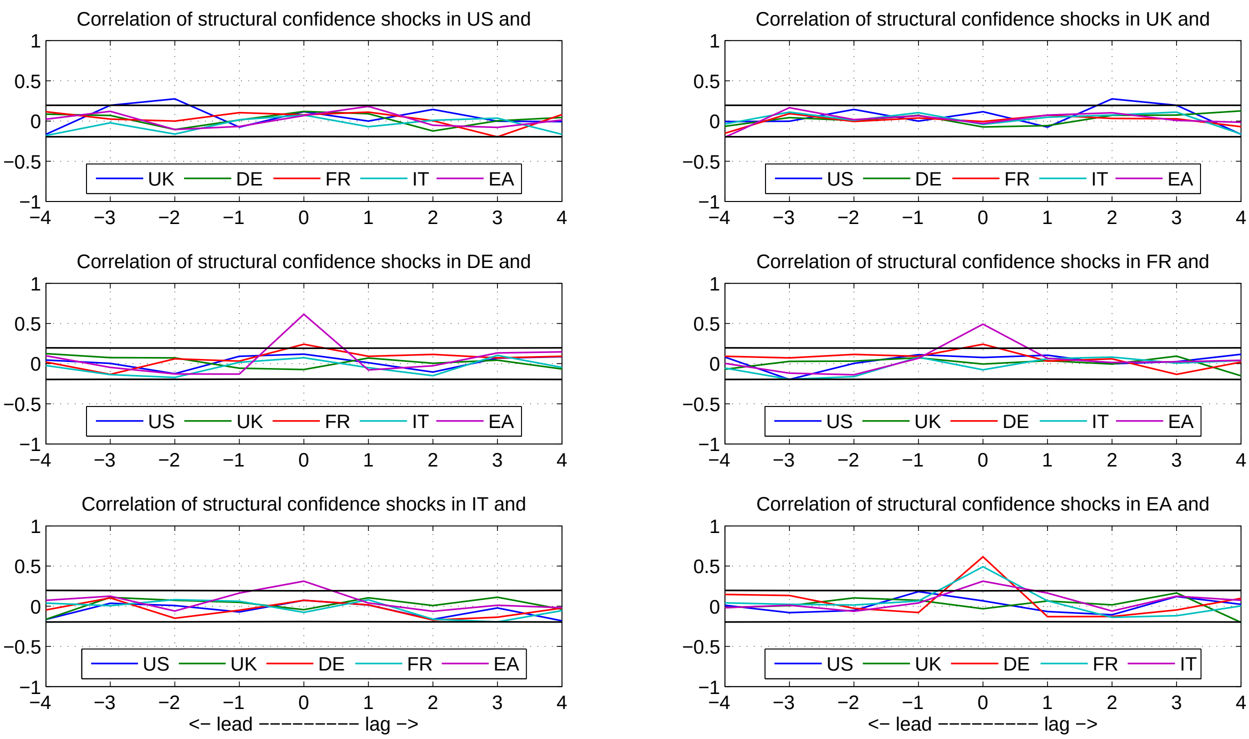

Figure 18: Lead and lag correlations of structural confidence shocks based on the FAVAR in (5) and (6).