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# ECONOMIC POLICY UNCERTAINTY AND INFLATION EXPECTATIONS

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**ABSTRACT:** Theory and evidence suggest that in an environment of well-anchored expectations, temporary economic news or shocks should not affect agents' expectations of inflation in the long term. Our estimated structural VARs show that both long- and short-term inflation expectations are sensitive to policy-related uncertainty shocks. While economic activity contracts, long-term inflation expectations raise in response to such shocks. These results suggest that observed uncertainty about the stance and perceived effectiveness of policy raises concerns about future inflation and entails additional risks to central banks' hard-won inflation credibility.

**KEYWORDS:** Policy uncertainty, central banks, inflation expectations, structural VAR.

**JEL CLASS.:** E02, E31, E58, E63, P16

**RÉSUMÉ:** La théorie suggère que dans un environnement où les anticipations sont bien ancrées, des "news" ou des chocs temporaires ne devraient pas affecter les anticipations d'inflation à long terme des agents. Notre VAR structurel estimé montre que les anticipations de court et long termes sont sensibles à des chocs d'incertitude liés à la politique économique. Tandis que l'activité se contracte, les anticipations d'inflation à long terme augmentent en réponse à ce type de chocs. Ces résultats suggèrent que l'incertitude autour de l'orientation et de l'efficacité de la politique économique soulève des interrogations sur l'inflation future et fait peser des risques additionnels sur la crédibilité des banques centrales.

**MOTS-CLÉS:** Incertitude sur la politique économique, banques centrales, anticipations d'inflation, VAR structurel.

**CLASSIFICATION JEL:** E02, E31, E58, E63, P16

## NON TECHNICAL SUMMARY

Policy-related uncertainty is seen by academics and market participants as a prominent contributor to the overall economic uncertainty observed during the recent crisis. In addition, a rapidly growing theoretical and empirical literature suggests that uncertainty has recessionary effects on economic activity. To date, the literature has focused on the effects of policy uncertainty on economic outcomes, such as output, investment, consumption and unemployment. However, less is known whether uncertainty caused by economic policy affects agents' expectations, and more specifically those about inflation. In this paper, we investigate this question empirically, by studying the dynamic relationship between policy-related uncertainty and measures of inflation expectations of professional forecasters.

We estimate structural Bayesian VARs, linking policy uncertainty with inflation expectations while accounting for a measure of economic activity and monetary policy, for the US and the euro area. We use the index of [Baker, Bloom, and Davis \(2012\)](#) as a measure of policy uncertainty. This index is supposed to capture uncertainty about what policy action the decision makers will undertake, uncertainty about the economic effects of current and future actions and/or inactions. This can be uncertainty about different economic policies altogether but in our estimations we provide evidence even for uncertainty related with fiscal and monetary policy. Regarding inflation expectations, we use survey-based expectations of professional forecasters as measured by Consensus Economics and Survey of Professional Forecasters, of the Federal Reserve Bank of Philadelphia and of the European Central Bank.

We find several effects of policy uncertainty. First, economic activity contracts given a surprise innovation to policy uncertainty. Second, inflation expectations are also responsive: short-term ones fall, reflecting the slack economy while long-term inflation expectations rise. Third, monetary policy-related uncertainty is not always the important factor behind the dynamics of inflation expectations. Fiscal policy-related uncertainty seems to also play an important role. Furthermore, monetary policy appears to face a trade-off between responding to the state of the economy and to long-run inflation expectations. Given an unexpected innovation to policy uncertainty, central banks lower interest rates strongly, resembling the response of a central bank that follows a typical Taylor rule, accommodating the economy in response to falling output and prices.

Theory and evidence suggest that in an environment of well-anchored expectations, temporary news or shocks to economic variables, should not have an effect on long-run

inflation expectations. However, we show that they increase in response to policy uncertainty shocks. Furthermore, these shocks account for about 10 to 30 percent of their variation. This result is fairly robust when taking into account specific policy-related uncertainties, different measures of inflation expectations, different orderings of the variables in the structural VARs, and different periods covered by the sample. A rise of long-term inflation expectations at times of economic contraction suggests that heightened policy uncertainty indeed raises concerns about an increase in future inflation.

Overall, these results support our hypothesis that, in an environment of increased policy uncertainty, agents begin to question the ability and the commitment of policy makers to deliver on their promises. This result is of current relevance especially for central banks conducting policy in an environment of near-zero interest rates. The credibility of central bank's commitment in the eyes of the public becomes crucial for the success of monetary policy at the zero lower bound. But this credibility is in doubt when there exists uncertainty about the details of the policy put in place, its effectiveness, the firmness of the commitment to future policies but also about other policies (i.e. fiscal). A clear communication on what policy makers can do and what they know, a prompt response to present challenges, and a long-term consistency of policies would help reduce policy uncertainty.

Our work contributes to the empirical literature on the macroeconomic effects of policy uncertainty. To our knowledge, our paper is the first to look at the effects of policy-related uncertainty shocks on inflation expectations. Furthermore, we are the first to provide empirical evidence on the impact of different types of policy-related uncertainty on economic activity. We confirm previous findings that uncertainty shocks generate economic contractions, for the US and the euro area. Our finding that policy uncertainty shocks pose upward risks to the anchoring of long-term inflation expectations is new to the literature.

## 1. INTRODUCTION

Policy-related uncertainty is seen by academics and market participants as a prominent contributor to the overall economic uncertainty observed during the recent crisis. In the World Economic Outlook of October 2012, the IMF states: “The biggest factor weighing on the world economy was uncertainty among investors over whether policymakers in advanced economies will deliver on promises.” These worries are grounded when taking into account a rapidly growing theoretical and empirical literature suggesting that uncertainty has recessionary effects on economic activity.<sup>1</sup> To date, the literature has focused on the effects of policy uncertainty<sup>2</sup> on economic outcomes, such as output, investment, consumption and unemployment (see among others [Baker, Bloom, and Davis \(2012\)](#) and [Fernandez-Villaverde, Guerron-Quintana, Rubio-Ramirez, and Uribe \(2011\)](#)). However, less is known whether uncertainty caused by economic policy affects agents’ expectations, and more specifically those about inflation.<sup>3</sup> In this paper, we investigate this question empirically, by studying the dynamic relationship between policy-related uncertainty and measures of inflation expectations of professional forecasters. Bearing in mind that inflation expectations contain important information on central bank credibility, a more general question is whether policy uncertainty undermines the credibility of policies and institutions. Academics and policy makers often state that the extent to which inflation expectations are anchored is the best measure of the credibility of monetary policy.

Our investigation comes at a time when central banks are still at the center stage to resolve the crisis. During the last years they resorted to standard and non-standard measures, aimed at providing support to the transmission mechanism of monetary policy. Some observers criticize them for this, some claim they go beyond their mandate and the general public shares the feeling they have not done enough to prevent the crisis.<sup>4</sup> Furthermore, regular surveys on public opinion and attitudes in Europe show a clear declining trend of trust and satisfaction with the way central banks have been doing their job (see Figure 9 in Appendix B). Given this situation, our hypothesis is that in the light of increased overall policy uncertainty (not necessarily only uncertainty about monetary

<sup>1</sup>Theoretically, uncertainty is supposed to reduce hiring, investment and consumption of durables in presence of adjustment costs ([Bernanke \(1983\)](#), [Dixit and Pindyck \(1994\)](#) and [Bentolila and Bertola \(1990\)](#)), financial frictions ([Arellano, Bai, and Kehoe \(2011\)](#), [Gilchrist, Sim, and Zakrajsek \(2010\)](#) and [Christiano, Motto, and Rostagno \(2010\)](#)), managerial risk aversion ([Panousi and Papanikolaou \(2011\)](#)) and precautionary motives.

<sup>2</sup>Policy uncertainty may be referred as policy risk as well. In this paper, we use the term policy uncertainty in line with the literature we follow.

<sup>3</sup>There are examples of theoretical models with incomplete information where agents’ beliefs and sentiments change in response to policy, see [Eusepi and Preston \(2010\)](#) and [Bianchi and Melosi \(2012\)](#) among others.

<sup>4</sup>This is based on the results from the FT/Harris poll, conducted online among 6,237 adults in France, Germany, the UK, Spain, Italy and the US, April 2008, August 2008 and February 2009.

policy) agents begin to question the ability (expertise) of policy makers as well as their commitment to their promises (targets). With respect to monetary authorities, this means to question their credibility. Shedding light on this issue is of great importance, considering the role that credibility and reputation have for policy effectiveness.<sup>5</sup>

We estimate structural Bayesian VARs, linking policy uncertainty with inflation expectations while accounting for a measure of economic activity and monetary policy, for the US and the euro area. We use the index of [Baker, Bloom, and Davis \(2012\)](#) as a measure of policy uncertainty. This index is supposed to capture uncertainty about what policy action the decision makers will undertake, uncertainty about the economic effects of current and future actions and/or inactions. This can be uncertainty about different economic policies altogether but in our estimations we provide evidence even for specific types of uncertainties related with fiscal and monetary policy. Regarding inflation expectations, we use short- and long-term survey-based inflation expectations of professional forecasters as measured by Consensus Economics and Survey of Professional Forecasters, of the Federal Reserve Bank of Philadelphia and of the European Central Bank.

We find several effects of policy uncertainty. First, economic activity contracts given a surprise innovation to policy uncertainty. Second, inflation expectations are also responsive: short-term ones fall, reflecting the slack economy while long-term inflation expectations rise. Third, monetary policy-related uncertainty is not always the important factor behind the dynamics of inflation expectations. Fiscal policy-related uncertainty seems to also play an important role. Furthermore, monetary policy appears to face a trade-off between responding to the state of the economy and to long-run inflation expectations. Given an unexpected innovation to policy uncertainty, central banks lower interest rates strongly, resembling the response of a central bank that follows a typical Taylor rule, accommodating the economy in response to falling output and prices.

Theory and evidence suggest that in an environment of well-anchored expectations, temporary news or shocks to economic variables, should not have an effect on long-run inflation expectations. However, we show that they increase in response to policy uncertainty shocks. Furthermore, these shocks account for about 10 to 30 percent of their variation. This result is fairly robust when taking into account specific policy-related uncertainties, different measures of inflation expectations, different orderings of the variables in the structural VARs, and different periods covered by the sample. A rise of long-term inflation expectations at times of economic contraction suggests that heightened policy uncertainty indeed raises concerns about an increase in future inflation. Overall, these results support our hypothesis that, in an environment of increased policy uncertainty,

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<sup>5</sup>The importance of reputation and credibility of central banks is well-recognized in theoretical works, starting with [Kydland and Prescott \(1977\)](#) and [Barro and Gordon \(1983\)](#).



agents begin to question the ability and the commitment of policy makers to deliver on their promises.

Our work is related to different strands of literature. First it relates to the literature on the macroeconomic effects of uncertainty in general (e.g. [Bernanke \(1983\)](#), [Dixit and Pindyck \(1994\)](#), [Bentolila and Bertola \(1990\)](#), [Arellano, Bai, and Kehoe \(2011\)](#), [Gilchrist, Sim, and Zakrajsek \(2010\)](#) and [Christiano, Motto, and Rostagno \(2010\)](#)) and of policy uncertainty in particular (e.g. [Fernandez-Villaverde et al. \(2011\)](#) and [Born and Pfeifer \(2011\)](#)). It also relates to the literature that studies changes in agents' beliefs in response to policy (e.g. [Eusepi and Preston \(2010\)](#) and [Bianchi and Melosi \(2012\)](#) among others). Specifically, our work adds to the existing empirical literature on the macroeconomic effects of uncertainty shocks (see [Alexopoulos and Cohen \(2009\)](#), [Baker, Bloom, and Davis \(2012\)](#), [Leduc and Liu \(2012\)](#), [Bachmann, Elstner, and Sims \(2013\)](#) and [Mumtaz and Zanetti \(2013\)](#) among others) and to the empirical literature of inflation expectations (see [Clark and Davig \(2008\)](#), [Mankiw, Reis, and Wolfers \(2004\)](#), [Coibion and Gorodnichenko \(2012\)](#), [Andrade and Bihan \(2013\)](#)).

We bridge these two strands of the empirical literature by highlighting a new channel through which policy uncertainty can affect the macroeconomy and providing empirical evidence for it. To our knowledge, our paper is the first to look at the effects of policy-related uncertainty shocks on inflation expectations. Furthermore, we are the first to provide empirical evidence on the impact of different types of policy-related uncertainty on economic activity. We confirm previous findings that uncertainty shocks generate economic contractions, for the US and the euro area. Our finding that policy uncertainty shocks pose upward risks to the anchoring of long-term inflation expectations is new to the literature.

The structure of the paper is as follows. Section 2 presents the policy uncertainty measure and an overview of the recent developments in inflation expectations. Section 3 presents the empirical methodology (structural VAR estimations) and the discussion of results. Section 4 concludes.

## 2. ECONOMIC POLICY UNCERTAINTY AND INFLATION EXPECTATIONS: AN OVERVIEW

In this section we discuss how economic policy-related uncertainty and inflation expectations are measured. We also show their evolution throughout the years and point out main episodes associated with increases in policy uncertainty.

**2.1. Measuring economic policy uncertainty.** Uncertainty is hard to quantify and most of the literature that studies how it impacts economic activity has relied on proxy measures for it. These proxies can be divided in different categories: uncertainty measures based on surveys (business surveys or professional forecasters surveys), on the corporate bond spread over treasuries, on stock market volatility and on stochastic volatility of macroeconomic variables. We use the index of economic policy uncertainty (hereafter EPU) proposed by [Baker, Bloom, and Davis \(2012\)](#). The EPU index is constructed for several developed countries and is based on two components<sup>6</sup>: newspaper coverage of policy-related economic uncertainty and the disagreement of professional forecasters on expected inflation and government expenditures. This measure is supposed to capture uncertainty about what policy actions the decision makers will undertake and uncertainty about the economic effects of current and future actions and/or inactions. This can be uncertainty about fiscal, monetary or other regulatory policies. Usages of the EPU index are found as well in recent empirical and theoretical works, see for example [Leduc and Liu \(2012\)](#), [Bachmann, Elstner, and Sims \(2013\)](#) and [Fernandez-Villaverde, Guerron-Quintana, Kuester, and Rubio-Ramirez \(2011\)](#).

In our estimations we use only the news-based<sup>7</sup> component of EPU for several reasons. First, we want to avoid a potential link between the “disagreement” component of the index with the inflation expectations we use in our VAR estimation. They are based on expectations of professional forecasters, either from Consensus Economics or Fed’s SPF. Furthermore, working with the news-coverage component allows us to distinguish between uncertainty coming from monetary, fiscal or labor market policies, for example. In this way, we are able to study whether other kinds of policy uncertainty are affecting the beliefs of agents about inflation expectations and about the ability of central bankers to deliver on their mandates.

However, the EPU index is a proxy variable and subject to measurement errors. For example, it is often questioned whether this index is just another measure of the state of the economy or whether it suffers from political slant. Certainly, policy uncertainty

<sup>6</sup>For the US it has an additional component, the number of federal tax code provisions set to expire in future years. For more information, visit [www.policyuncertainty.com](http://www.policyuncertainty.com).

<sup>7</sup>Literature knows uses of narrative as variables: [Romer and Romer \(1989\)](#) and [Romer and Romer \(2004\)](#) to identify monetary policy shocks, [Ramey and Shapiro \(1998\)](#) and [Ramey \(2011\)](#) for fiscal policy shocks and [Doms and Morin \(2004\)](#) explore the linkages between media coverage of economic events, consumers’ perceptions, and economic outcomes.

is part of overall economic uncertainty and [Baker, Bloom, and Davis \(2012\)](#) show that at certain times, it is its main contributor. In response to potential measurement errors, they evaluate the index in several ways and argue that, although present to a small extent, these issues do not undermine the accuracy of the index. For example, they find a strong correlation between the computerized newspaper component<sup>8</sup> of the EPU index and a measure of what a human reader would call economic policy uncertainty. They also show that the EPU index is consistent with the frequency of the word "uncertain" in the FOMC Beige Book and with the responses of the stock market generated by policy news. Moreover, the EPU index does not appear to be strongly affected by newspaper political slant.

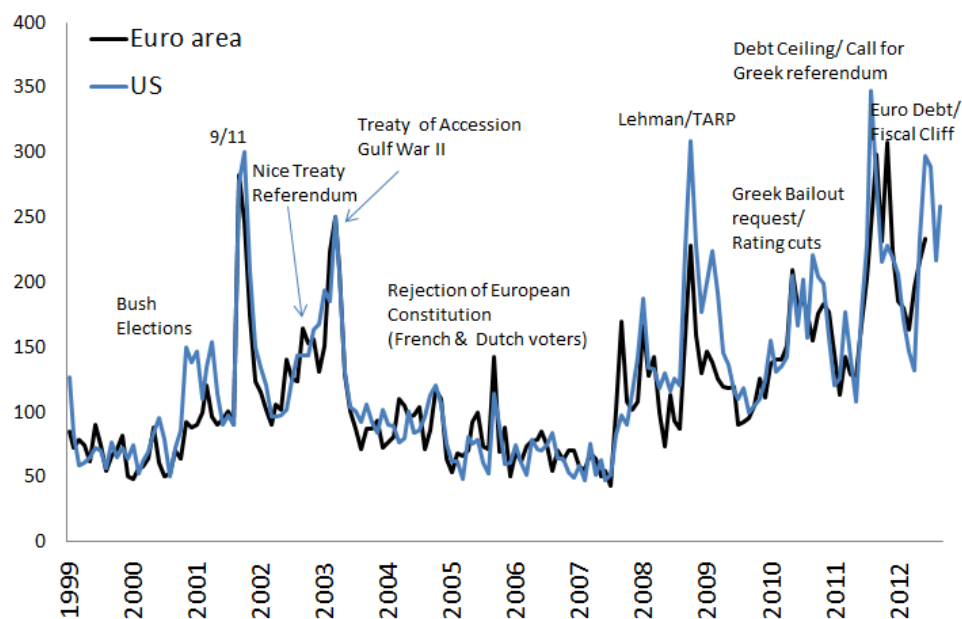
Figure 1 shows the evolution of news-based policy uncertainty for the US and the euro area. This measure varied over time and increased sharply during the recent crisis. Increases in the levels of policy-related uncertainty are observed especially around events with unpredictable outcomes. For the euro area and the US one can identify common spikes corresponding to 9/11, the Gulf War II in 2003, the Lehman Brothers collapse in 2008 and the intensification of the European debt crisis in 2012. Specific spikes for the euro area appear around events related with the Treaty referendums in 2001 and 2005, the Greek bailout in 2010, the rating cuts in 2011, and the call for referendum by Greece's prime minister in 2011. For the US they correspond to the presidential elections in 1992, 2000 and 2008, and to the debates on the fiscal stimulus (2008), on the debt ceiling (2011) and on the fiscal cliff (2012).

Especially in recent years, we have observed policies that have generated uncertainty about future inflation. For instance, there has been criticism towards the ECB potentially acting beyond its mandate through the bond-buying programs, first announced in 2010. These programs raised concerns about the ECB being at risk of operating under fiscal dominance, thereby harming its independence. This, in turn, would lead to a difficulty for the ECB to ensure price stability. Policy uncertainty that might feed into expectations about future inflation has also arisen from the discussions about the exit strategies of the central banks that implemented quantitative easing. If not done carefully, exit from massive monetary stimulus could jeopardize future price stability. Moreover, uncertainty arising from fiscal pressures in the US, also raises concerns about the Fed being able to deliver price stability in the future. Therefore, it seems important to investigate whether in an environment of high policy-related uncertainty, these concerns have fed into agents' perceptions regarding policy makers and their policies.

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<sup>8</sup>The newspaper component of the EPU index is based on automatic searches of specific terms related to economic uncertainty and policy in the largest newspapers for each country.

FIGURE 1. News-based component of EPU for US and the euro area



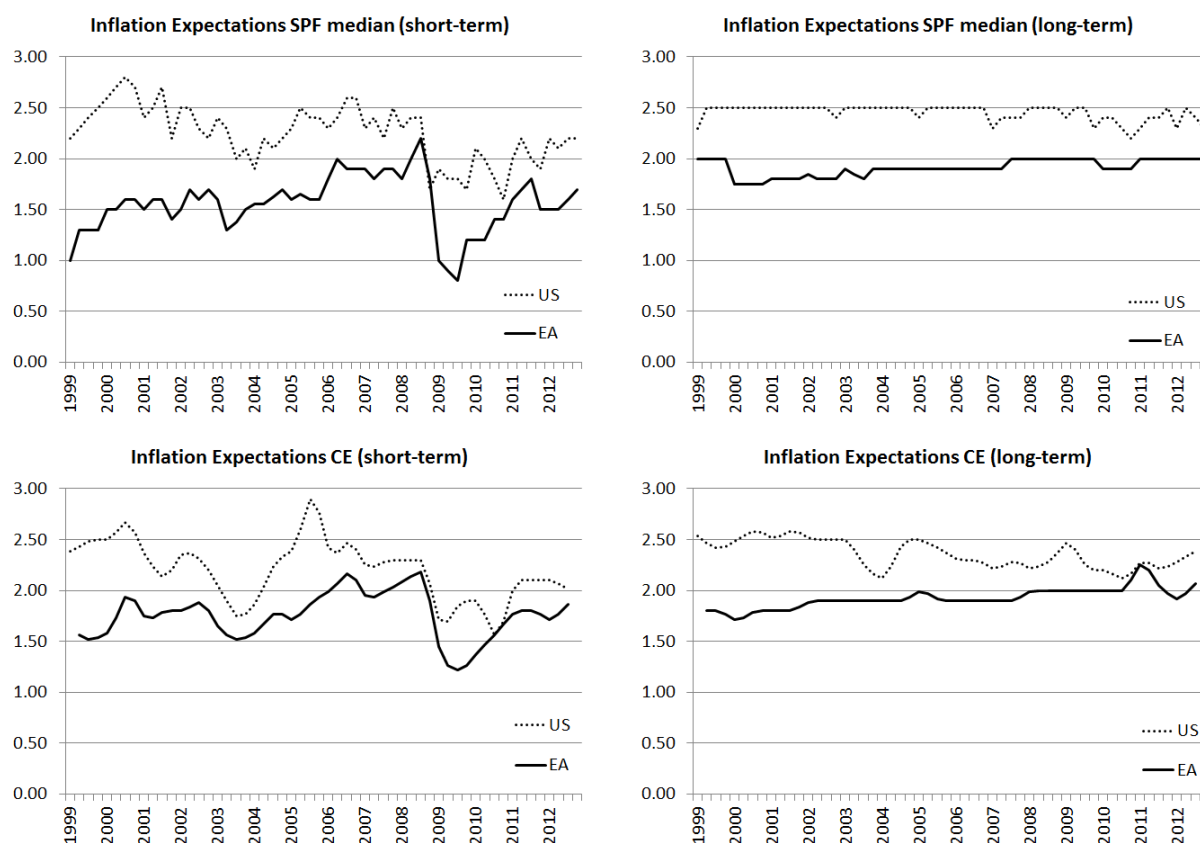
Source: Baker, Bloom and Davis (2012) and <http://www.policyuncertainty.com/>

**2.2. Inflation expectations.** There are different measures of inflation expectations: survey-based expectations of general public or professional forecasters, and financial market-based ones. Differences among them might reflect heterogeneities in the expectation formation mechanism across agents. Survey-based expectations are beliefs of professional forecasters (i.e., banks, research institutions) about what inflation will be in the future, from one quarter ahead up to ten years ahead. Financial market-based inflation expectations, the so-called breakeven inflation rates (BEIRs), result from the difference between nominal Treasury bonds and Treasury inflation-protected securities. In our study, we focus on the survey-based measures of inflation expectations since they reflect the beliefs of the agents only on inflation and do not include financial market-related risks. BEIRs are available at higher frequency but incorporate other factors in addition to concerns about inflation, such as information on risk premia as well as changes related to the trading conditions. Even though the literature offers methods to distinguish the inflation expectations component from the other two risks, there is still no consensus about the best way of doing this.

Inflation expectations are measured at different horizons. Usually, expectations up to two years ahead are referred as short-term expectations and expectations five years ahead and more as long-term inflation expectations. Short-term expectations are vulnerable to temporary shocks and more volatile than long-term expectations. Because long-term expectations can profoundly influence current economic behavior, monetary authorities monitor them carefully with the aim to provide a long-term nominal anchor for the economy. Economic behavior could be affected by changes in expectations through multiple

channels. Higher inflation expectations put upward pressure on wages, as workers demand increases in wages to offset the expected loss of purchasing power in the future, and on prices, as firms try to raise the prices to offset the expected rise in their marginal costs. Moreover, asset prices and investment plans are affected by changes in inflation expectations. Well-anchored long-term inflation expectations are key to the functioning of the monetary policy transmission mechanisms and they appear to be a crucial indicator of central bank credibility and, indirectly, of central banks' success (ECB, Monthly Bulletin, May 2009). This becomes especially central in periods characterized by large shocks to the economic and financial activity, and also in periods with extraordinary levels of uncertainty.<sup>9</sup>

FIGURE 2. Recent developments of short- and long-term inflation expectations



Notes: Long-term (5 years ahead) and short-term (1 year ahead) survey-based inflation expectations obtained from the Survey of Professional Forecasters (SPF) and from the Consensus Economics (CE).

Figure 2 shows the evolution of survey-based measures of long-term inflation expectations for the US and the euro area. Long-term inflation expectations in the euro area have generally been lower than in the US and have moved within a narrow band. However, they have been more volatile after the Lehman bankruptcy. On the other hand,

<sup>9</sup>Policy makers acknowledge that well-anchored inflation expectations provide an assessment of the suitability of the monetary policy stance: "Ultimately, the firm anchoring of inflation expectations remains the best way to check the appropriateness of monetary policy in an uncertain environment." (Bini-Smaghi 2009).

long-term BEIRs show a greater volatility throughout the whole sample (see Figure 10 in Appendix B). They are especially more responsive to news in the post-Lehman period, reflecting liquidity and risk premia concerns in financial markets. Several analyzes on the development of inflation expectations during the crisis show that long-term inflation expectations have become less firmly anchored, to a larger extent in the UK and in the US, relative to the euro area (see among others, [Galati, Poelhekke, and Zhou \(2011\)](#)).

### 3. POLICY UNCERTAINTY SHOCKS - A VAR ANALYSIS

In this section we study the effects of policy-related uncertainty shocks on inflation expectations using VAR techniques. We introduce the estimation methodology and the data used before discussing the results.

**3.1. The model.** To study our question of interest we employ VAR models that have the following standard representation:

$$y_t = A_0 + A_1 y_{t-1} + \dots + A_p y_{t-p} + B_0 z_t + u_t \quad (1)$$

for  $t = 1, \dots, T$ , where  $y_t$  is a  $n \times 1$  vector of endogenous variables,  $z_t$  is a  $m \times 1$  vector of exogenous variables,  $p$  is the number of lags and  $u_t$  represents the reduced-form errors,

$$u_t \sim iid N(0, \Sigma). \quad (2)$$

Let  $k = np + m + 1$  and define the  $k \times n$  matrix of coefficients taking the following form:  $\Theta = (A_0, A_1, \dots, A_p, B_0)'$ . The VAR can be conveniently rewritten as a multivariate regression model in matrix notation:

$$Y = X\Theta + U. \quad (3)$$

We have defined the  $T \times n$  matrices  $Y$  and  $U$  and the  $T \times k$  matrix  $X$  as:

$$Y = \begin{bmatrix} y_1' \\ y_2' \\ \dots \\ y_T' \end{bmatrix}, \quad X = \begin{bmatrix} x_1 \\ x_2 \\ \dots \\ x_T \end{bmatrix}, \quad x_t = (1, y_{t-1}', \dots, y_{t-p}', z_t') \text{ and } U = \begin{bmatrix} u_1' \\ u_2' \\ \dots \\ u_T' \end{bmatrix}. \quad (4)$$

We employ Bayesian techniques for estimation. Our prior and posterior for  $(\Theta, \Sigma)$  belong to the Normal-Whishart family, as in [Uhlig \(2005\)](#)<sup>10</sup>. Making use of all the definitions

<sup>10</sup>For more details see Appendix C.

above, the likelihood function of  $(\Theta, \Sigma)$  based on  $Y$  takes the following form:

$$p(Y|\Theta, \Sigma) \propto \frac{1}{|\Sigma|^{T/2}} \times \exp \left\{ -\frac{1}{2} \text{trace}[\Sigma^{-1} \hat{S}] \right\} \times \exp \left\{ -\frac{1}{2} \text{trace}[\Sigma^{-1} (\Theta - \hat{\Theta})' X' X (\Theta - \hat{\Theta})] \right\}, \quad (5)$$

where we have used the Maximum Likelihood Estimators (MLE) of  $\Theta$  and  $\Sigma$ ,

$$\hat{\Theta} = (X'X)^{-1}(X'Y) \quad \text{and} \quad \hat{\Sigma} = \frac{1}{T}(Y - X\hat{\Theta})'(Y - X\hat{\Theta}) \quad (6)$$

with  $\hat{S} = (Y - X\hat{\Theta})'(Y - X\hat{\Theta})$ .

If the prior is described by  $\bar{\Theta}_0$ ,  $N_0$ ,  $S_0$  and  $\nu_0$ , then the posterior is described by  $\bar{\Theta}_T$ ,  $N_T$ ,  $S_T$  and  $\nu_T$  where:

$$\begin{aligned} \nu_T &= T + \nu_0, \\ N_T &= N_0 + X'X, \\ \bar{\Theta}_T &= N_T^{-1}(N_0\bar{\Theta}_0 + X'X\hat{\Theta}), \\ S_T &= \frac{\nu_0}{\nu_T}S_0 + \frac{T}{\nu_T}\hat{\Sigma} + \frac{1}{\nu_T}(\hat{\Theta} - \bar{\Theta}_0)'N_0N_T^{-1}X'X(\hat{\Theta} - \bar{\Theta}_0). \end{aligned} \quad (7)$$

Following Uhlig (2005), we use a flat prior with  $N_0 = 0$ ,  $\nu_0 = 0$ ,  $S_0$  and  $\bar{\Theta}_0$  being arbitrary. Then the posterior is characterized by  $N_T = X'X$ ,  $\nu_T = T$ ,  $S_T = \hat{\Sigma}$  and  $\bar{\Theta}_T = \hat{\Theta}$ .

We estimate the above model (BVAR) for the US and the euro area. In addition to the individual BVARs, we also estimate a panel-VAR including both economies, in order to get more statistical power and to increase the precision of our estimates, given the relatively short data sample for the euro area (starting in 1999). This approach allows us to uncover common dynamic relationships for the US and the euro area while accounting for country-specific fixed effects.

The fixed-effects panel VAR is characterized by the same structure as the standard VAR presented above but the representation includes additionally a cross-sectional dimension. A panel VAR model with fixed effects and common slope coefficients can be written in the following form:

$$y_{i,t} = A_{0i} + A_1 y_{i,t-1} + \dots + A_p y_{i,t-p} + B_0 z_{i,t} + u_{i,t} \quad (8)$$

for  $t = 1, \dots, T$ , where  $i = 1, \dots, I$  is the number of cross-sections,  $y_{i,t}$  is a  $n \times 1$  vector of endogenous variables,  $z_{i,t}$  is a  $m \times 1$  vector of exogenous variables,  $A_{0i}$  are unit specific intercepts that also include unit-fixed effects, and  $u_{i,t}$  represents the reduced-form errors,

$$u_{i,t}|y_{i,t-1} \sim iid N(0, \Sigma_i). \quad (9)$$



**3.2. Data and Estimation.** We estimate structural BVARs for the US and the euro area, with the following vector of endogenous variables:  $y_t = (epu_t, gdp_t, \pi_{long|t}^e, \pi_{short|t}^e, i_t)$ , with  $epu_t$  being the news-based economic policy uncertainty,  $gdp_t$  the real GDP, the  $\pi_{long|t}^e$  and  $\pi_{short|t}^e$  the long- and short- term inflation expectations, respectively and  $i_t$  being the short-term interest rate. The same variables enter in the panel-BVAR as well. The BVARs also include a constant and an exogenous variable, either the oil prices or the US industrial production, depending on the country-specific BVARs. This model allows us to study the impact of policy uncertainty on inflation expectations, while accounting for a measure of economic activity and monetary policy, in a parsimonious way.

As a proxy for policy uncertainty we use the corresponding country-specific, news-based policy uncertainty index of [Baker, Bloom, and Davis \(2012\)](#). The overall policy uncertainty measure,  $epu_t$ , incorporates uncertainty about different types of policy altogether, like fiscal, monetary, financial or any other type of regulatory policies. However, we are interested in studying the effects of uncertainty related with specific policies separately, as well. If the structural VAR estimations show that the overall policy uncertainty is significant for the dynamics of inflation expectations, being able to identify the specific policy responsible for these dynamics is important. On the other hand, specific-types of policy uncertainty could have a higher relevance for the dynamics of certain variables, even when the overall policy uncertainty does not. Our framework allows us to study these options.

In our analysis we also explore the effects of monetary and fiscal policy-related uncertainty, separately. Measures of monetary policy- and fiscal policy-related uncertainty are constructed by [Baker, Bloom, and Davis \(2012\)](#) and are currently available only for the US and Germany.<sup>11</sup> To our knowledge we are the first to use this novel data set in the empirical literature on the macroeconomic effects of uncertainty. In our estimations we use the measures for Germany as proxies for the euro area. One should keep in mind that these measures capture the policy uncertainty as discussed in the German media. This uncertainty is often related with important policies or developments outside the country as well. For the monetary policy-related uncertainty the approximation seems reasonable, given that there is a single monetary policy in the euro area. With respect to fiscal policy this match might appear weak at first sight. However, especially during the last years, fiscal issues across the euro area have been closely followed by the German public and heavily discussed in the media. Observing the evolution of the German index for fiscal policy uncertainty (Figure 8, panel b, in Appendix B) after 2008 one can see that it spikes around the Greek bailout at the beginning of 2010, the rating cuts of periphery countries in 2011, and the call of the prime minister of Greece for referendum on a new

<sup>11</sup>Details on the construction of each index are presented in Appendix A.



bailout at the end of 2011. This shows that the German measure is picking up the main concerns about fiscal policy in the euro area.

We use survey-based measures of inflation expectations from two sources, the Consensus Economics (CE) and the Survey of Professional Forecasters (SPF) of the Fed of Philadelphia and of the ECB, respectively.<sup>12</sup> These sources provide surveys of professional forecasters. In both, CE and SPF, the respondents are usually banks, universities, financial firms, consulting groups, and economic forecasters at large companies. Sometimes the respondents overlap between these two sources but in general the composition is different. Furthermore, the number of respondents in these surveys is different. CE surveys report the inflation expectations of about 240 respondents compared to about 90 respondents for the Fed's SPF and about 40 respondents for the ECB's SPF. In our estimations, the short-term inflation expectations refer to the expected inflation one year ahead,  $\pi_{short|t}^e = \pi_{t+1|t}^e$ . On the other hand, the long-term inflation expectations refer to the expected inflation five years ahead,  $\pi_{long|t}^e = \pi_{t+5|t}^e$ . Only in the case of the Fed's SPF, long-term inflation expectations refer to expectations over the next ten years.<sup>13</sup> That is, for the case of the US, the period for which long-term expectations are measured differs between the CE and the Fed's SPF, making the results not directly comparable.

Another option would be to also check for the effect of policy uncertainty shocks on the financial market-based inflation expectations, the so-called breakeven inflation rates (BEIRs) resulting from the difference between nominal Treasury bonds and Treasury inflation-protected securities. Although BEIRs are attractive because of their availability in high frequency, two issues arise. First, these rates do not reflect only inflation risks but also liquidity and risk premium concerns. Second, even though the literature offers methods to distinguish the inflation expectations component from the other two risks, there is still no consensus about the best way of doing this.

All BVARs are estimated at a quarterly frequency. Our variables of interest are available in different frequencies, monthly (policy uncertainty), quarterly (real GDP, SPF short- and long-term inflation expectations, CE short-term inflation expectations) and biannual (CE long-term inflation expectations). We use them all at quarterly frequency.<sup>14</sup> Biannual data are linearly interpolated to monthly frequency. Then, for all monthly series we use the end of quarter observation. The interpolation of the CE inflation expectations from semi-annual to quarterly frequency does not seem to be innocuous to our main results. In general, data aggregation or interpolation pose additional difficulties for the

<sup>12</sup>More details on these data can be found in Appendix A.

<sup>13</sup>Starting from 2005, Fed's SPF is also collecting the inflation expectations over the next five years.

<sup>14</sup>We have estimated our BVARs in monthly and biannual frequency as well and main results are comparable. Results from these estimations are available upon request.

researcher that wants to identify structural shocks based on timing restrictions. The interpolation of CE long-term inflation expectations might hinder our identification strategy as a two-sided filter might destroy the temporal ordering. To check if our results are sensitive to this issue, we have also estimated our BVARs with CE long-term expectations at quarterly frequency constructed differently, with the value for the missing quarter being substituted with the value of the previous quarter.

Policy uncertainty and real GDP enter the estimation in log levels, and inflation expectations and interest rates in percent. For the panel-BVAR estimation, the period covered is 1999Q1-2012Q3, constrained by the availability of the data for the euro area. For US, the period covered is 1991Q4-2012Q3. We provide inference through the median response and its 68 percent posterior distribution, based on 2000 draws.<sup>15</sup> We also calculate the forecast error variance decomposition (FEVD) in order to assess the relative contribution of the policy uncertainty shock to fluctuations in our chosen variables. As described above, the VAR coefficients are drawn from a normal-inverse-Wishart distribution with flat prior. A flat prior allows us to use the benefits of the Bayesian techniques while having our results more data-driven, making them easily comparable with those in the related literature that do not use Bayesian methods for estimation. The optimal lag is selected based on the BIC information criteria and reported below each figure of results.

**3.3. Identification Strategy.** The identification of uncertainty shocks is recent in the empirical literature and most of the studies have identified them using the recursive Cholesky decomposition, see [Alexopoulos and Cohen \(2009\)](#), [Baker, Bloom, and Davis \(2012\)](#), [Leduc and Liu \(2012\)](#) and [Bachmann, Elstner, and Sims \(2013\)](#)<sup>16</sup>, among others. We use this identification strategy with the following ordering of variables:  $epu_t, gdp_t, \pi_{long|t}^e, \pi_{short|t}^e, i_t$ . Under this ordering, policy uncertainty does not contemporaneously respond to other shocks while an innovation to it can have an immediate effect on the variables ordered after. This assumption is broadly in line with how uncertainty is treated in theoretical models. For example, in [Fernandez-Villaverde, Guerron-Quintana, Kuester, and Rubio-Ramirez \(2011\)](#), the process for policy uncertainty, represented by the stochastic volatility of the policy instrument, is exogenous and an innovation to it has an immediate impact on economic activity.

Under our identification strategy, we relax the exogeneity restriction on policy uncertainty and allow it to respond with delay to other shocks through the lag polynomial. Policy uncertainty, as measured by the EPU index, could arise not only from unexpected innovations to policy but also as a response to other shocks in the economy. For example,

<sup>15</sup>The estimation methodology builds on [Uhlig \(2005\)](#). Calculation of posterior distributions are made following [Reppa \(2009\)](#).

<sup>16</sup>[Bachmann, Elstner, and Sims \(2013\)](#) have used in addition long-term restriction to identify uncertainty shocks.

a contractionary shock hitting the economy could also lead to a rise in policy uncertainty if the public does not know how policy will respond. In the benchmark BVAR we assume that uncertainty about policy is affected only with delay to such shocks. Given these assumptions, the relationship between the reduced-form errors,  $u_t$  and structural shocks,  $\epsilon_t$ , is presented as below.

$$\begin{pmatrix} u_t^{epu} \\ u_t^{gdp} \\ \pi_{long|t}^e \\ u_t^{\pi_{short|t}^e} \\ u_t^i \end{pmatrix} = \begin{bmatrix} x & 0 & 0 & 0 & 0 \\ x & x & 0 & 0 & 0 \\ x & x & x & 0 & 0 \\ x & x & x & x & 0 \\ x & x & x & x & x \end{bmatrix} \times \begin{pmatrix} \epsilon_t^{epu} \\ \epsilon_t^2 \\ \epsilon_t^3 \\ \epsilon_t^4 \\ \epsilon_t^5 \end{pmatrix}$$

In our estimations, a policy uncertainty shock corresponds to an increase of two standard deviations in the policy uncertainty measure. Although not standard in the VAR literature, this size is still underestimating the policy uncertainty variation that both the US and the euro area have faced, especially during the recent crisis. For example, [Baker, Bloom, and Davis \(2012\)](#) use the increase in the overall policy uncertainty from 2006 to 2011 as the size of the policy uncertainty shock. In our case, this corresponds to a four standard deviations shock, for the US. Since the VAR responses are linear, one could simply multiply our responses by two in order to quantify the effects of such large shocks.

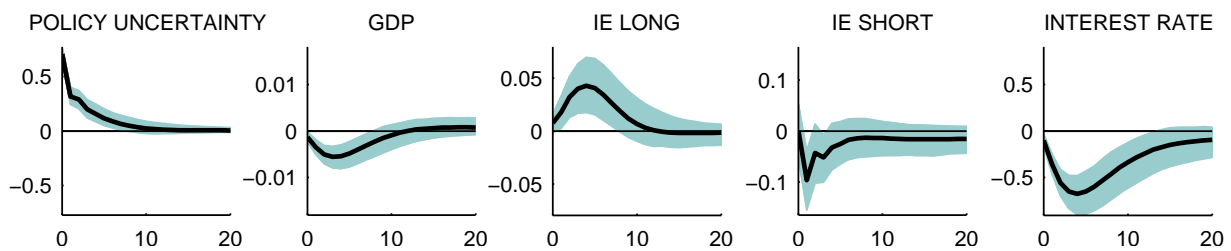
**3.4. Results and discussion.** In the following we present the results from the estimation of the panel-BVAR with country fixed effects and from the individual country-BVARs. In all figures, the solid line, in black, denotes the point-wise posterior median impulse response from the estimated BVARs and the shaded area represents the corresponding 68 percent posterior distribution. In order to get a general overview of the effect of the policy uncertainty shock in the model, we start by showing the responses of all our variables from the estimation of the panel-BVAR with CE expectations, given a shock to the overall policy uncertainty (see Figure 3). Then we focus only on the results for inflation expectations (Figures 4 to 6) along three dimensions, (1) the source of inflation expectations, (2) the type of policy uncertainty and, (3) the term-structure of the inflation expectations (long and short-term). More specifically, in each of these figures, the left column shows the responses to inflation expectations from the CE and the right column the responses of the expectations from the SPF. In all figures, panel (a) presents the responses to an overall policy uncertainty shock and panels (b) and (c) the responses to a monetary policy- and to a fiscal policy-related uncertainty shock, respectively.<sup>17</sup>

In Figure 3 we observe that in response to a two standard deviation innovation in the EPU measure, the real GDP contracts, short-term inflation expectations fall following

<sup>17</sup>We show the complete set of responses of all our variables to policy uncertainty shocks in Appendix D.

slack economy and interest rates decrease considerably in response to weak economy. On the other hand, long-term inflation expectations rise. This response peaks around the third quarter (about 5 basis points) and dies out in two years. Similar patterns are observed even when looking at the responses of inflation expectations along our different dimensions. In all panels of Figure 4, an innovation in the respective measure of policy uncertainty induces an increase in the median response of long-term inflation expectations. This response peaks in about three quarters irrespective of the source, SPF or CE, although in magnitude the peak is higher for CE expectations. That is, for the SPF expectations, the responses are slightly muted when compared with those from the CE, but one should bear in mind that for the case of US, the SPF long-term refers to inflation expectations over a longer period (next 10 years). Along the shock dimension, the rise of long-term inflation expectations appears slightly stronger given a monetary policy-related uncertainty shock.

FIGURE 3. IRFs to the overall EPU shock for the panel-BVAR (CE expectations)

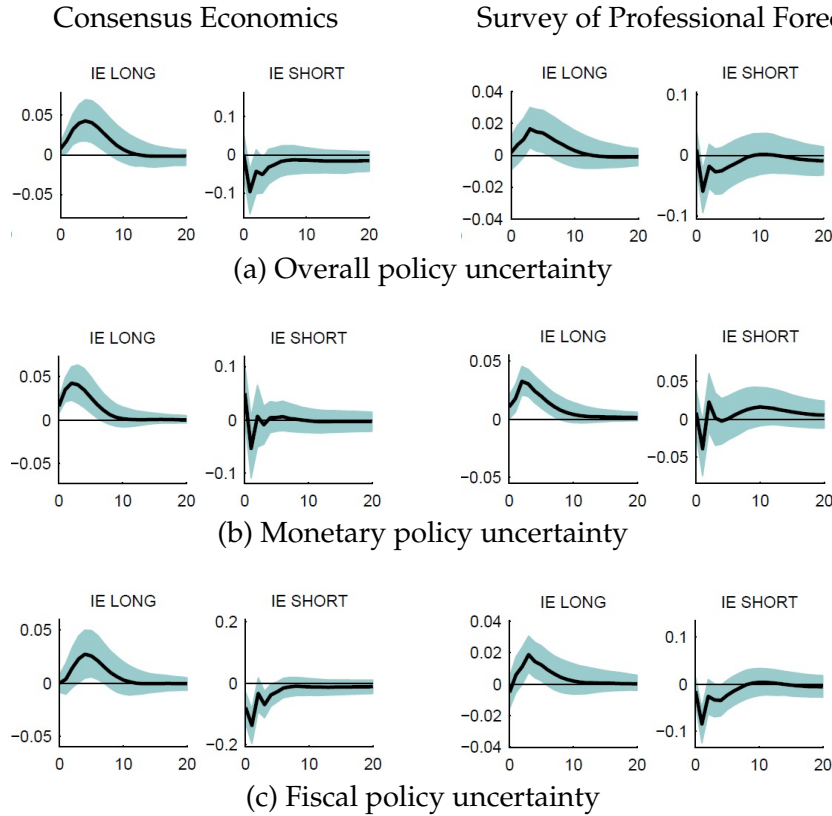


Notes: The solid line in black denotes median impulse response from the estimated panel-BVAR(2) and the shaded area the corresponding 68 percent credible band. BVARs include a constant and an exogenous variable, log level of crude oil prices. Policy uncertainty and GDP are in log levels. IE Long and IE Short represent five- and one- year ahead inflation expectations, in percent. Source of inflation expectations: Consensus Economics. Period: 1999Q1-2012Q3. Horizontal axis is lag horizon in quarters.

On the other hand, the response of short-term inflation expectations to policy uncertainty shocks remains on the negative side. When compared with the response of long-term inflation expectations, they show a higher degree of responsiveness (up to 15 basis points) and volatility. One year ahead inflation expectations of professional forecasters appear to be more responsive to overall policy uncertainty and to fiscal policy uncertainty. As before, expectations from CE respondents appear to react stronger in magnitudes than the SPF ones.

Figure 5 and 6 report the results from the estimation of the individual BVARs, for the US and euro area, respectively. In general the results are qualitatively similar with those from the panel-BVAR, with certain differences. For the US, the median response of long-term inflation expectations (5 years ahead) from Consensus Economics is positive given an overall and a monetary policy uncertainty shock. However, the respective 68 percent credible bands do include zero in the first quarters. The peak response is delayed to the tenth quarter, with median response increasing by 3 basis points. SPF long-term inflation

FIGURE 4. IRFs of inflation expectations to EPU shocks for the panel-SVAR

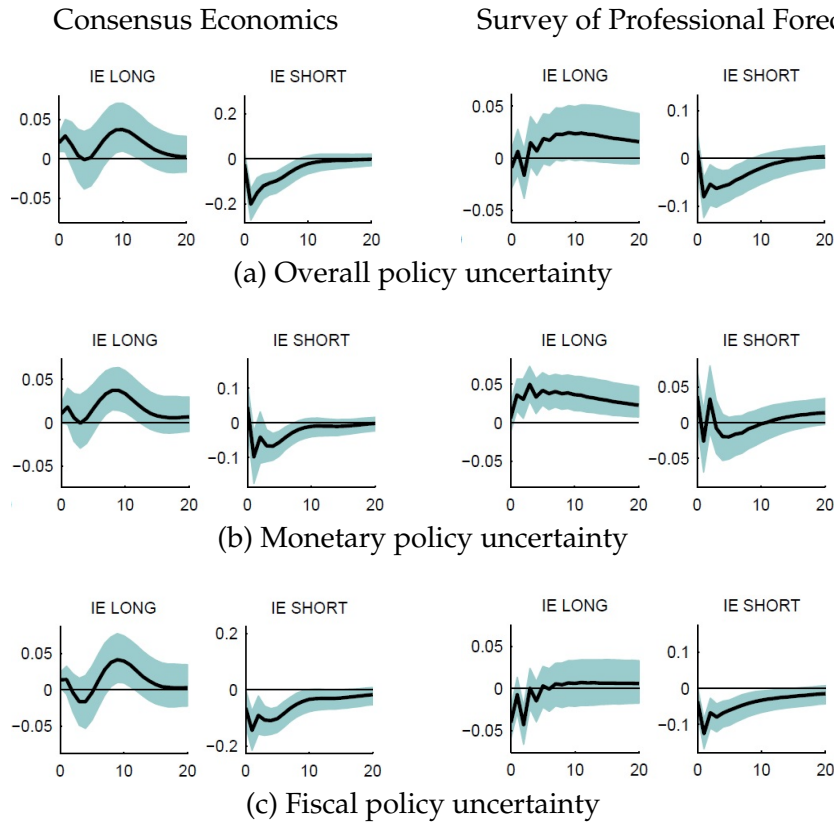


Notes: The solid line in black denotes median impulse response from the estimated panel-BVAR(2), with  $y_t = (epu_t, gdp_t, \pi_{long|t}^e, \pi_{short|t}^e, i_t)$ , a constant and log level of crude oil prices as an exogenous variable. The shaded area corresponds to the 68 percent credible set. Policy uncertainty and GDP are in log levels. IE Long and IE Short represent five- and one- year ahead inflation expectations, in percent. For Fed SPF, IE Long represents the expectations over the next 10 years. The period: 1999Q1-2012Q3. Horizontal axis is lag horizon in quarters.

expectations (over the next 10 years) respond stronger to the monetary policy uncertainty shock. The posterior impulse response is sharper when compared with the responses to the other uncertainty shocks. The median response goes up to 5 basis points and reverts slowly only after 20 quarters. Responses to an overall policy and a fiscal policy uncertainty shock indicate more uncertainty about the sign and the magnitude of the effect of these shocks on the long-term inflation expectations of professional forecasters. The reaction of short-term inflation expectations to policy uncertainty shocks for the US is on the negative side. A stronger response is observed for the CE expectations, with a fall up to 20 basis points in the first two quarters. These responses are especially sharper given an overall policy and a fiscal policy uncertainty shock.

Figure 6 reports the results from the estimation of the BVAR for the euro area. The response of long-term inflation expectations (5 years ahead) from CE is slightly stronger and sharper than the response of expectations from SPF. The posterior median is positive for at least 5 quarters given all three types of policy uncertainty shocks. Here again we observe a peak response of about 3 basis points, which reverts fast and then bounces

FIGURE 5. IRFs of inflation expectations to EPU shocks for the US



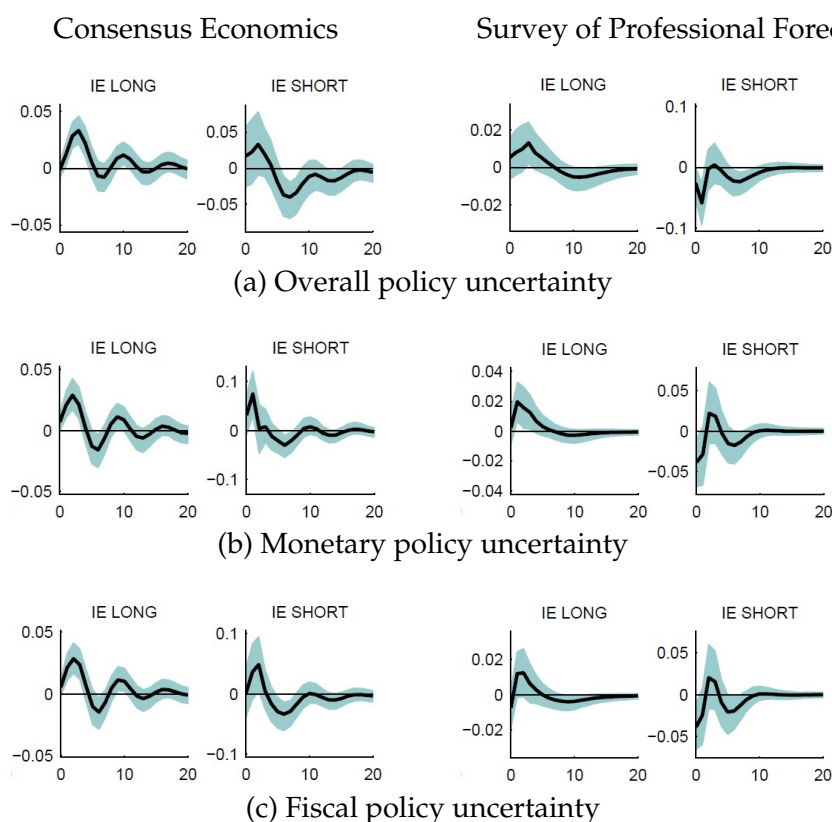
*Notes:* The solid line in black denotes median impulse response from the estimated SVARs(2) for the US, with  $y_t = (epu_t, gdp_t, \pi_{long|t}^e, \pi_{short|t}^e, i_t)$ , a constant and log level of crude oil prices as an exogenous variable. The shaded area corresponds to the 68 percent credible set. Policy uncertainty and GDP are in log levels. IE Long and IE Short represent five- and one- year ahead inflation expectations, in percent. For Fed SPF, IE Long represents the expectations over the next 10 years. *The period:* 1991Q4-2012Q3. Horizontal axis is lag horizon in quarters.

around the zero line. In the case of the SPF expectations the reversion is slower and smoother. The immediate response of the SPF short-term inflation expectations to policy uncertainty shocks is negative. Differently, the CE short-term inflation expectations increase in response to such shocks. However, the increase of the median is short-lived, lasting only about two to three quarters. The response is slightly sharper given a monetary policy uncertainty shock.

With respect to other variables, we observe that in all estimations a policy uncertainty shock is associated with an economic contraction. The GDP contraction appears on impact and up to 1 percent in the case of the US, and delayed and muted for the euro area (see Appendix D, Figures 11 to 16). For US, the real GDP declines for about three quarters and the recovery phase lasts up to ten quarters. Specific policy uncertainty shocks produce qualitatively comparable responses for the real GDP. On the other hand, central banks in both economies respond with lowering interest rates strongly given a positive innovation to all types of policy uncertainty measures that we consider. If we take into account that short-term inflation expectations are highly correlated with actual inflation



FIGURE 6. IRFs of inflation expectations to EPU shocks for the euro area



*Notes:* The solid line in black denotes median impulse response from the euro area BVARs(2), with  $y_t = (epu_t, gdp_t, \pi_{long|t}^e, \pi_{short|t}^e, i_t)$ , a constant and log level of US industrial production as an exogenous variable. The shaded area corresponds to the 68 percent credible set (posterior distribution). Policy uncertainty and GDP are in log levels. IE Long and IE Short represent five- and one- year ahead inflation expectations, in percent. The period: 1999Q1-2012Q3. Horizontal axis is lag horizon in quarters.

(about 60 to 70 percent in our sample), then this move resembles the response of a central bank that follows a typical Taylor rule, accommodating the economy in response to falling output and prices.

The GDP decline, immediate or not, and its relatively quick reversal seem to be in line with previous findings in both the theoretical and the empirical literature on the macroeconomic effects of uncertainty shocks. The magnitudes are also comparable.<sup>18</sup> The empirical finding on the effect of specific types of policy uncertainty is new to the literature. We find that monetary- and fiscal policy-related uncertainty are equally harmful to economic growth. Different channels through which policy uncertainty affects economic activity could be at work, such as the precautionary saving motive or the “wait and see”

<sup>18</sup>The majority of previous studies in the literature have considered the response to a two standard deviation innovation of such shocks, to approximate the level of uncertainty that was observed during the recent crisis.

dynamics, the former affecting negatively aggregate consumption and the latter affecting investment.<sup>19</sup>

With regard to long-term inflation expectations, theory and evidence suggest that in an environment of well-anchored expectations, temporary news or shocks to economic variables, should not have an effect on them. However, they appear sensitive to policy uncertainty shocks in our BVAR analysis. We observe that long-term inflation expectations increase. The magnitude does not seem high at first sight. However taking into account that uncertainty shocks in our sample have been up to 4 standard deviations, that induces a high enough rise on long term inflation expectations (about 10 basis point) to miss the ECB's "below, but close to, 2%" or Fed's 2% inflation objective.

In addition, the table below shows the forecast variance error decomposition of long-term inflation expectations to policy uncertainty shocks. We observe that such shocks account for about 10 to 30 percent of the variation of long-term inflation expectations. This contribution is not negligible having in mind the small variation of long-term inflation expectations in our sample and that the majority of it is explained by its own shocks.<sup>20</sup>

TABLE I. FEVD (posterior median) of long-term inflation expectations

	Overall EPU	MP Uncertainty	FP Uncertainty
<b>Consensus Economics</b>			
10 - 20 quarters	<b>13.59</b> (4.56,26.61)	<b>11.11</b> (4.36,22.30)	<b>6.71</b> (2.15,16.05)
<b>SPF</b>			
10 - 20 quarters	<b>8.66</b> (3.34,9.52)	<b>17.14</b> (8.04,28.03)	<b>7.67</b> (3.16,16.19)

Notes: Posterior median of FEVD from the panel-BVAR. In brackets its 68% posterior distribution.

A rise of long-term inflation expectations in times of economic contraction suggests that heightened policy uncertainty indeed raises concerns about an increase in future inflation. Furthermore, we show that monetary policy-related uncertainty does not seem to always be the reason for this. This result is new to the empirical literature and compatible with the predictions of recent theoretical models that study inflation expectations in relation with changes in policy (see [Eusepi and Preston \(2010\)](#) and [Bianchi and Melosi \(2012\)](#), among others). For instance, [Bianchi and Melosi \(2012\)](#) build a DSGE model where under incomplete information, inflation expectations risk becoming unanchored as monetary policy shifts between periods of active inflation stabilization (active regime) and

<sup>19</sup>The idea behind this concept is that in the presence of high uncertainty and adjustment frictions, firms pause hiring and investment, and wait for calmer periods to expand. Under these conditions, production falls but pick-ups quickly due to pent-up demand for production factors ([Bernanke \(1983\)](#), [Dixit and Pindyck \(1994\)](#), [Bloom \(2009\)](#) and [Bloom, Floetotto, Jaimovich, Saporta-Eksten, and Terry \(2012\)](#)).

<sup>20</sup>As parallelism, the VAR literature on effects of monetary policy shocks has estimated not more than 10 and 20 percent contribution of monetary shocks on FEVD of output and prices, respectively.



periods during which the emphasis is mainly on output stabilization (passive regime). Deviations from low inflation policies are not penalized immediately because agents are "optimistic" that the deviation is short lasting. Once there is uncertainty about the duration of the passive regime, inflation expectations rise.

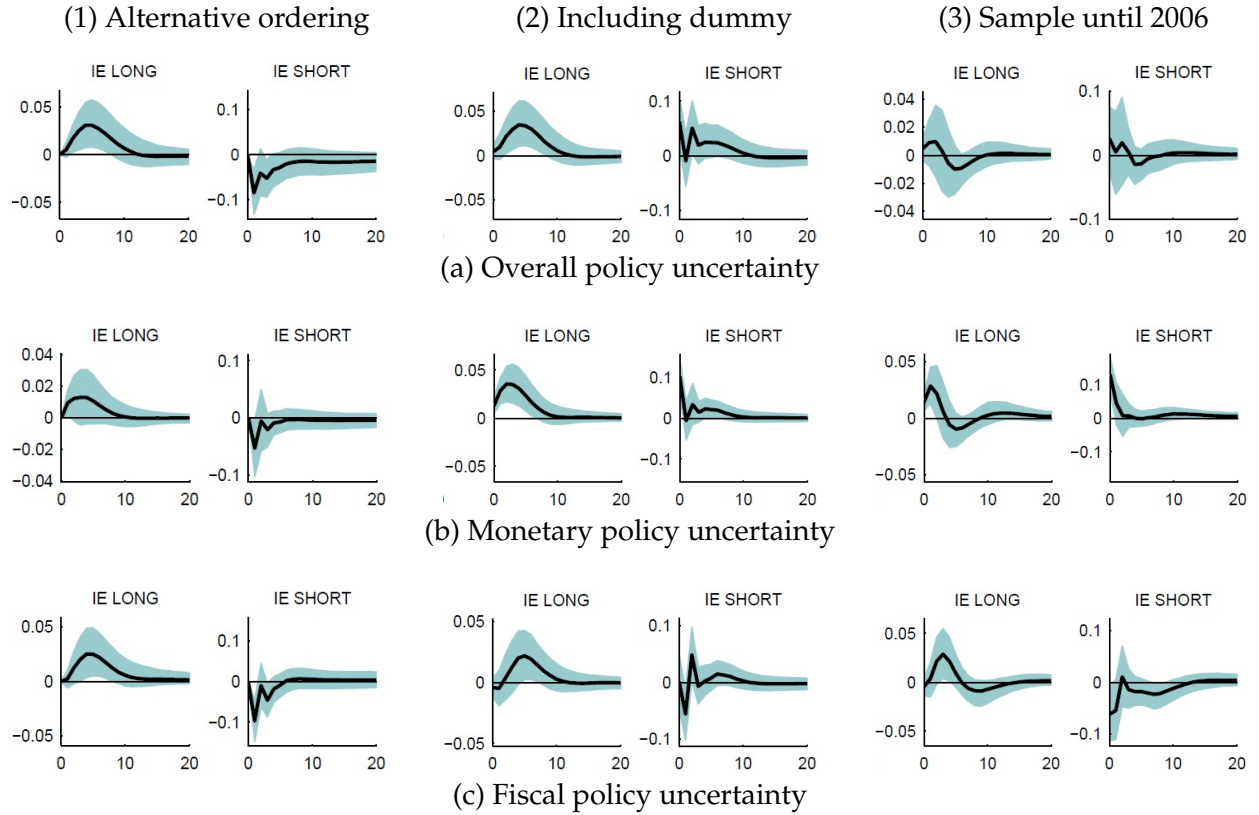
Moreover, the opposite directions of the responses of short- and long-term inflation expectations to a policy uncertainty shock provide us with further evidence on low probability events (i.e. policy regime switches) being taken into account when forming expectations. For example, agents might believe that there is a likelihood of switching to a high inflation regime, hence long-term inflation expectations rise. But because this regime has very low probability of occurring it is unlikely that we observe it in our data sample. Therefore, short-term inflation expectations do not rise on medium-term.

Overall, we argue that even though the commitment of central banks to a stable and low inflation has not changed, agents seem to perceive that it would be more difficult for central banks to achieve their targets. Such a scenario is likely when taking into account the unprecedented policies monetary authorities took in response to the recent crisis and the problems arising from large fiscal deficits; if they are not well-managed they risk fueling inflationary pressures.

**3.5. Robustness checks.** In the following we examine whether our main results are sensitive to issues related with the identification of the policy uncertainty shocks and to the sample selected for analysis. First we investigate if the results are sensitive to the ordering of the variables in the BVAR. As discussed above, the identification of uncertainty shocks is recent and a consensus on the best identifying restrictions is yet to be reached in the literature. In our benchmark identification, policy uncertainty responds immediately only to its innovations and with a delay to other shocks. Here we relax this assumption and the order of the variables in the BVAR is:  $gdp_t, \pi_{long|t}^e, \pi_{short|t}^e, i_t, epu_t$ . Under this ordering, policy uncertainty is allowed to be affected immediately by all the shocks. In the first column of Figure 7 we show the results from the panel-BVAR with this alternative ordering.

Furthermore, in our benchmark estimations we include short-term interest rates to account for conventional monetary policy. However, starting from the fourth quarter of 2008 both the Fed and the ECB turned to unconventional policies. To account for this, we include a dummy variable in our BVARs that takes the value of one starting from the fourth quarter of 2008. We present the results related with this robustness check for the panel-BVAR in the second column of Figure 7. We also check if our main results hold when the period corresponding to the recent crisis is excluded. To this aim, we estimate our BVARs with the data sample ending in the fourth quarter of 2006. The

FIGURE 7. IRFs of inflation expectations to EPU shocks for the panel-BVAR (CE expectations)



Notes: The solid line in black denotes median impulse response from the panel-BVAR(2), with  $y_t = (epu_t, gdp_t, \pi_{long|t}^e, \pi_{short|t}^e, i_t)$ , a constant and log level of crude oil prices as an exogenous variable. The shaded area corresponds to the 68 percent credible set (posterior distribution). Policy uncertainty and GDP are in log levels. IE Long and IE Short represent five- and one- year ahead inflation expectations, in percent. Period: 1999Q1-2012Q3. Horizontal axis is lag horizon in quarters. We show the results of three robustness checks: (1) reordering the endogenous variables,  $y_t = (gdp_t, \pi_{long|t}^e, \pi_{short|t}^e, i_t, epu_t)$ ; (2) including a dummy that takes the value of one starting from 2008Q4; (3) splitting the sample until 2006Q4.

results pertaining to this estimation for the panel-BVAR are presented in the third column of Figure 7.

After performing the sensitivity checks described above, we observe that our result from the benchmark analysis holds: innovations to policy uncertainty induce an increase in the median response of long-term inflation expectations. With respect to short-term inflation expectations, we observe that their response is sensitive to the sample period taken into account. When the recent crisis is excluded or when the period of unconventional policies is accounted for (by including the dummy variable), short-term inflation expectations increase in response to policy uncertainty shocks. However, they still fall given a fiscal policy uncertainty shock. With respect to the real GDP and interest rates, we generally observe the same qualitative results as in the benchmark analysis.

#### 4. CONCLUDING REMARKS

We bridge the existing empirical literature on the macroeconomic effects of uncertainty shocks and the empirical literature on inflation expectations and provide first evidence on the effects of policy-related uncertainty, coming from extraordinary events and actions of decision makers, on beliefs and perceptions of agents towards them. Previous studies have shown that policy uncertainty is harmful for investments, consumption and employment. In this paper we show that the observed uncertainty about the stance and perceived effectiveness of policy should be troubling for central bankers<sup>21</sup> as it seems to entail additional risks to their hard-won inflation credibility.

Using BVARs we investigate whether policy-related uncertainty, as quantified by [Baker, Bloom, and Davis \(2012\)](#), has fed into inflation expectations in the US and the euro area. We find that while economic activity contracts, long-term inflation expectations rise in response to a policy-related uncertainty shock. This finding is robust across the two countries, different specifications, more specific measures for policy uncertainty, different measures of inflation expectations, and different orderings of the variables in the BVARs. Our results show that long-term inflation expectations of professional forecasters are not perfectly anchored and that policy-related uncertainty poses upside risks to them.

Given that well-anchored long-term inflation expectations reflect the credibility of monetary policy, we find support for the hypothesis that, in an environment of increased policy uncertainty, agents begin to question the ability and the commitment of policy makers to deliver on their promises. This result is of current relevance especially for central banks conducting policy in an environment of near-zero interest rates. The credibility of central bank's commitment in the eyes of the public becomes crucial for the success of monetary policy at the zero lower bound. But this credibility is in doubt when there exists uncertainty about the details of the policy put in place, its effectiveness, the firmness of the commitment to future policies but also about other policies (i.e. fiscal). A clear communication on what policy makers can do and what they know, a prompt response to present challenges, and a long-term consistency of policies would help reduce policy uncertainty.

In this paper we study the expectations of professional forecasters, which are some of the most informed agents in the economy. However, it would also be interesting to study how general public's expectations and perceptions towards central banks are affected by policy uncertainty. Examining this issue is of interest for several reasons: the general public constitutes a large proportion of the agents in the economy, they are generally less financially literate than the professional forecasters, and they are more likely to be

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<sup>21</sup>Governor of Bank of Canada, Mark Carney, made such a remark on policy uncertainty in his speech "Uncertainty and Global Recovery" in October 2012, at Vancouver Island Economic Summit.

influenced by the media. Particularly, one could study the role of policy uncertainty for the dynamics of trust in the ECB and of satisfaction with the way BoE is doing its job to preserve price stability, given the negative trends observed in these measures during the last years. We plan to investigate these issues in future works.

## REFERENCES

- ALEXOPOULOS, M., AND J. COHEN (2009): "Uncertain Times, Uncertain measures," Working Papers 352, University of Toronto.
- ANDRADE, P., AND H. L. BIHAN (2013): "Inattentive professional forecasters," *Journal of Monetary Economics*, 60(8), 967–982.
- ARELLANO, C., Y. BAI, AND P. KEHOE (2011): "Financial Markets and Fluctuations in Uncertainty," Society for Economic Dynamics, 2011 Meeting Papers 896.
- BACHMANN, R., S. ELSTNER, AND E. R. SIMS (2013): "Uncertainty and Economic Activity: Evidence from Business Survey Data," *American Economic Journal: Macroeconomics*, 5(2), 217–249.
- BAKER, S., N. BLOOM, AND S. J. DAVIS (2012): "Measuring Economic Policy Uncertainty," Stanford mimeo.
- BARRO, R., AND D. GORDON (1983): "Rules, Discretion, and Reputation in a Model of Monetary Policy," *Journal of Monetary Economics*, 12(1), 101–121.
- BENTOLILA, S., AND G. BERTOLA (1990): "Firing Costs and Labour Demand: How Bad Is Eurosclerosis?," *Review of Economic Studies*, 57(3), 381–402.
- BERNANKE, B. (1983): "Irreversibility, Uncertainty, and Cyclical Investment," *The Quarterly Journal of Economics*, 98(1), 85–106.
- BIANCHI, F., AND L. MELOSI (2012): "Constrained Discretion and Central Bank Transparency," Mimeo.
- BLOOM, N. (2009): "The Impact of Uncertainty Shocks," *Econometrica*, 77(3), 623–685.
- BLOOM, N., M. FLOETOTTO, N. JAIMOVICH, I. SAPORTA-EKSTEN, AND S. J. TERRY (2012): "Really Uncertain Business Cycles," NBER Working Papers 18245 77(3).
- CHRISTIANO, L., R. MOTTO, AND M. ROSTAGNO (2010): "Financial Factors in Economic Fluctuations," European Central Bank, Working Paper Series 1192.
- CLARK, T. E., AND T. DAVIG (2008): "An Empirical Assessment of the Relationships Among Inflation and Short and Long term Expectations," Federal Reserve Bank of

Kansas City, Research Working Paper RWP 08-05.

COIBION, O., AND Y. GORODNICHENKO (2012): "What can survey forecasts tell us about informational rigidities?," *Journal of Political Economy*, 120, 116–159.

DIXIT, A., AND R. S. PINDYCK (1994): in *Investment under Uncertainty* Princeton University Press, Princeton, New Jersey.

DOMS, M., AND N. MORIN (2004): "Consumer sentiment, the economy, and the news media," Working Papers in Applied Economic Theory, Federal Reserve Bank of San Francisco.

EUSEPI, S., AND B. PRESTON (2010): "Central Bank Communication and Expectations Stabilization," *American Economic Journal: Macroeconomics*, 2(3), 235–71.

FERNANDEZ-VILLAVERDE, J., P. GUERRON-QUINTANA, K. KUESTER, AND J. RUBIO-RAMIREZ (2011): "Fiscal Volatility Shocks and Economic Activity," NBER Working Papers 17317.

FERNANDEZ-VILLAVERDE, J., P. GUERRON-QUINTANA, J. F. RUBIO-RAMIREZ, AND M. URIBE (2011): "Risk Matters: The Real Effects of Volatility Shocks," *American Economic Review*, 101(6), 2530–61.

GALATI, G., S. POELHEKKE, AND C. ZHOU (2011): "Did the Crisis Affect Inflation Expectations?," *International Journal of Central Banking*, 7(1), 167–207.

GILCHRIST, S., J. W. SIM, AND E. ZAKRAJSEK (2010): "Uncertainty, Financial Frictions and Investment Dynamics," Society for Economic Dynamics, Meeting Papers 1285.

KYDLAND, F., AND E. PRESCOTT (1977): "Rules Rather than Discretion: The Inconsistency of Optimal Plans," *Journal of Political Economy*, 85(3), 473–492.

LEDUC, S., AND Z. LIU (2012): "Uncertainty Shocks are Aggregate Demand Shocks," Federal Reserve Bank of San Francisco, Working Paper Series, 2012-10.

MANKIW, N. G., R. REIS, AND J. WOLFERS (2004): "Disagreement about Inflation Expectations," in *NBER Macroeconomics Annual 2003, Volume 18*, NBER Chapters, pp. 209–270. National Bureau of Economic Research, Inc.

- MUMTAZ, H., AND F. ZANETTI (2013): "The Impact of the Volatility of Monetary Policy Shocks," *Journal of Money, Credit and Banking*, 45(4), 535–558.
- PANOUSI, V., AND D. PAPANIKOLAOU (2011): "Investment, Idiosyncratic Risk, and Ownership," *Journal of Finance*, 67, 1113–1148.
- RAMEY, V. A. (2011): "Identifying Government Spending Shocks: It's All in the Timing," *The Quarterly Journal of Economics*, 126(1), 1–50.
- RAMEY, V. A., AND M. D. SHAPIRO (1998): "Costly Capital Reallocation and the Effects of Government Spending," *Carnegie-Rochester Conference Series on Public Policy*, 48(1), 145–194.
- REPPA, Z. (2009): "A joint macroeconomic-yield curve model for Hungary," MBN Working Paper, 2009/1.
- ROMER, C. D., AND D. H. ROMER (1989): "Does Monetary Policy Matter? A New Test in the Spirit of Friedman and Schwartz," *NBER Macroeconomics Annual*, 4, 121–170.
- (2004): "A New Measure of Monetary Shocks: Derivation and Implications," *American Economic Review*, 94, 1055–1084.
- UHLIG, H. (2005): "What are the Effects of Monetary policy on Output? Results from an Agnostic Identification Procedure," *Journal of Monetary Economics*, 52.

## APPENDIX A. DATA

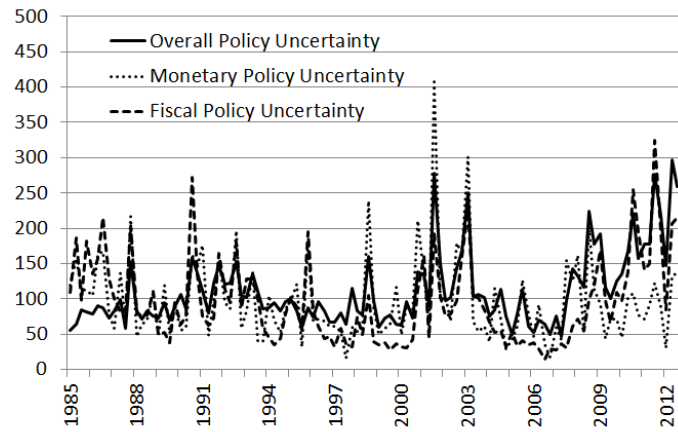
TABLE II. Data description

Variable	Description	Source	Frequency
Overall Policy Uncertainty	The number of news articles containing the terms 'uncertain' or 'uncertainty', 'economic' or 'economy', as well as policy relevant terms (scaled by the smoothed number of articles containing 'today'). Policy relevant terms include: 'policy', 'tax', 'spending', 'regulation', 'central bank', 'budget', and 'deficit'.	Baker, Davis and Bloom (2012), data as in December 2012	Monthly
Monetary Policy Uncertainty	The number of news articles containing the terms 'uncertain' or 'uncertainty', 'economic' or 'economy', as well as monetary policy relevant terms (scaled by the smoothed number of articles containing 'today'). Monetary policy relevant terms include: 'monetary policy', 'interest rates', 'inflation', 'central bank'.	Baker, Davis and Bloom (2012), data as in December 2012	Monthly
Fiscal Policy Uncertainty	The number of news articles containing the terms uncertain or uncertainty, economic or economy, as well as fiscal policy relevant terms (scaled by the smoothed number of articles containing 'today'). Fiscal policy relevant terms include: 'fiscal policy', 'fiscal stimulus', 'stimulus debate', 'government debt', 'debt ceiling', 'tax', 'taxes', 'taxation', 'government spending', 'budget', and 'deficit'.	Baker, Davis and Bloom (2012), data as in December 2012	Monthly
Industrial Production	Industrial production index (2005 = 100).	Eurostat, Federal Reserve statistics	Monthly
Real GDP	Real Gross Domestic Product (chain-linked volumes, reference year 2005 (at 2005 exchange rates)), seasonally adjusted and adjusted data by working days.	Eurostat	Quarterly
Interest rates	Short term interest rates (3-month money market rates).	Eurostat	Quarterly
Net Trust - ECB	The difference between the share of respondents who state they tend to trust and the share of respondents who state they tend not to trust the ECB.	Eurobarometer surveys, European Commission	Biannual
Net Satisfaction - BoE	The difference between the shares of satisfied and non-satisfied respondents.	Bank of England	Quarterly
CE (+1) - Europe and US	Inflation expectations for one year ahead of professional forecasters. Respondents are 240 prominent forecasters in the G-7 countries and western Europe, and are asked what their expectation about inflation is one year ahead.	Consensus Economics	Quarterly
CE (+5) - Europe and US	Inflation expectations for five years ahead of professional forecasters.	Consensus Economics	Biannual
SPF (+1), (+5) - Europe	Inflation expectations for one and five years ahead of professional forecasters. Participants are asked to provide their expectations for the calendar year $x$ years ahead. Respondents are about 90 forecasters.	Survey of Professional Forecasters (ECB)	Quarterly
SPF (+1), (+10) - US	Forecasts for the annual average rate of CPI inflation over the next one and 10 years of professional forecasters. Respondents are about 40 forecasters.	Survey of Professional Forecasters (Philadelphia Fed)	Quarterly

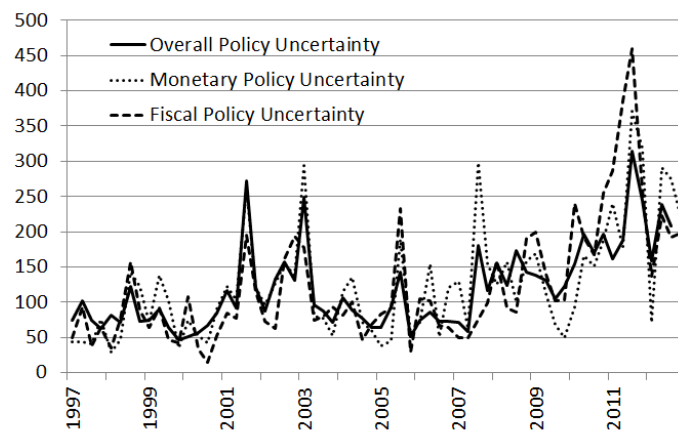


## APPENDIX B. STYLIZED FACTS

FIGURE 8. Recent developments of news-based policy uncertainty



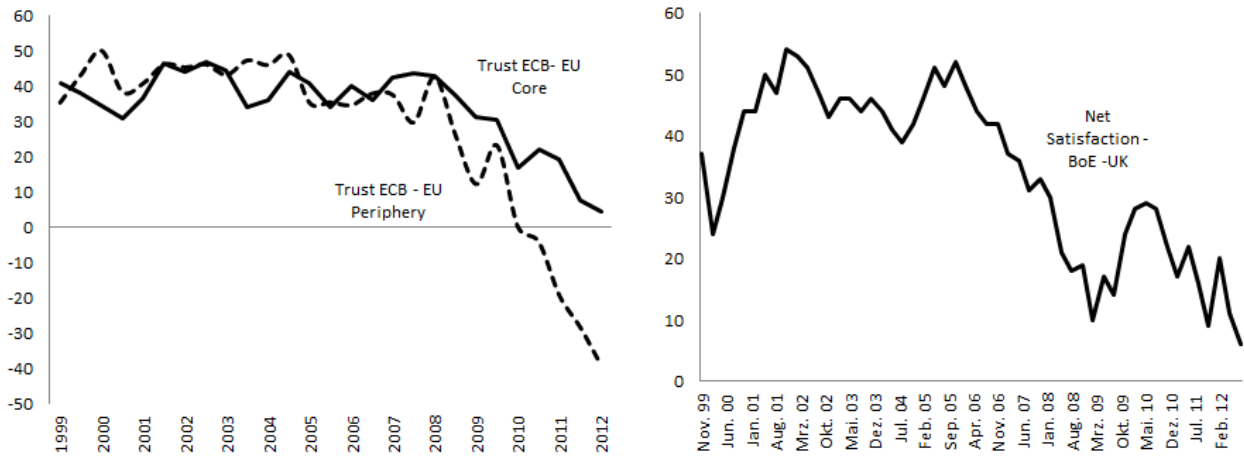
(A) United States



(B) Euro area

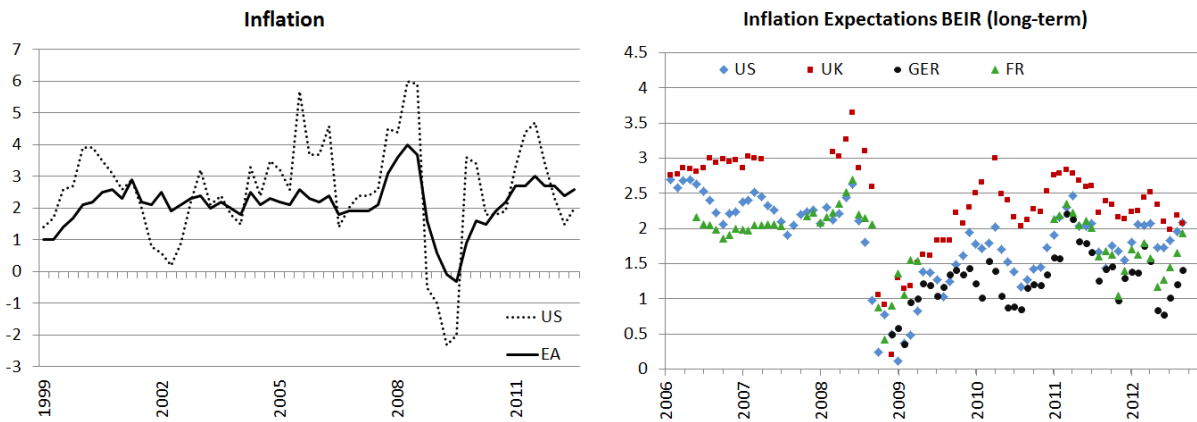
*Notes:* All the measures of policy uncertainty displayed above are newspaper-based measures and are taken from [Baker, Bloom, and Davis \(2012\)](#). For the monetary and fiscal policy uncertainty measures corresponding to euro area we use the German measures.

FIGURE 9. General public opinion towards central banks in Europe



Notes: Net trust in the ECB is defined as the difference between the share of respondents who state they tend to trust and the share of respondents who state they tend to not trust the ECB. Net satisfaction with Bank of England (BoE) is the share of satisfied minus the dissatisfied respondents when asked to assess the way the BoE is doing its job to set interest rates to control inflation. Sources: Standard Eurobarometer Survey, BoE.

FIGURE 10. Recent developments of inflation and long-term market-based inflation expectations



Notes: Actual inflation (HICP) and long-term (5 years ahead) Break Even Inflation Rates (BEIR). Source: Bloomberg .

### APPENDIX C. PRIORS

As in Uhlig (2005), a proper Normal-Whishart distribution is parametrized by a mean coefficient matrix  $\bar{\Theta}$  of size  $k \times n$ , a positive definite mean covariance matrix  $S$  of size  $n \times n$ , a positive definite matrix  $N$  of size  $k \times k$  and a degrees of freedom real number  $\nu \geq 0$  to describe the uncertainty about  $(\Theta, \Sigma)$  around  $(\bar{\Theta}, S)$ . The Normal-Whishart distribution specifies that  $\Sigma^{-1}$  follows a Whishart distribution  $W_n(S^{-1}/\nu, \nu)$  with  $E[\Sigma^{-1}] = S^{-1}$ , and that, conditionally on  $\Sigma$ , the columnwise vectorized form of the coefficient matrix,  $vec(\Theta)$ , follows a Normal distribution  $N(vec(\bar{\Theta}), \Sigma \oplus N^{-1})$ . To draw from the the

Whishart distribution  $W_n(S^{-1}/\nu, \nu)$ , a method is to calculate  $\Sigma = (RR')^{-1}$ , where  $R$  is a matrix of size  $n \times \nu$  with each column an independent draw from the Normal distribution  $N(0, S^{-1}/\nu)$ .

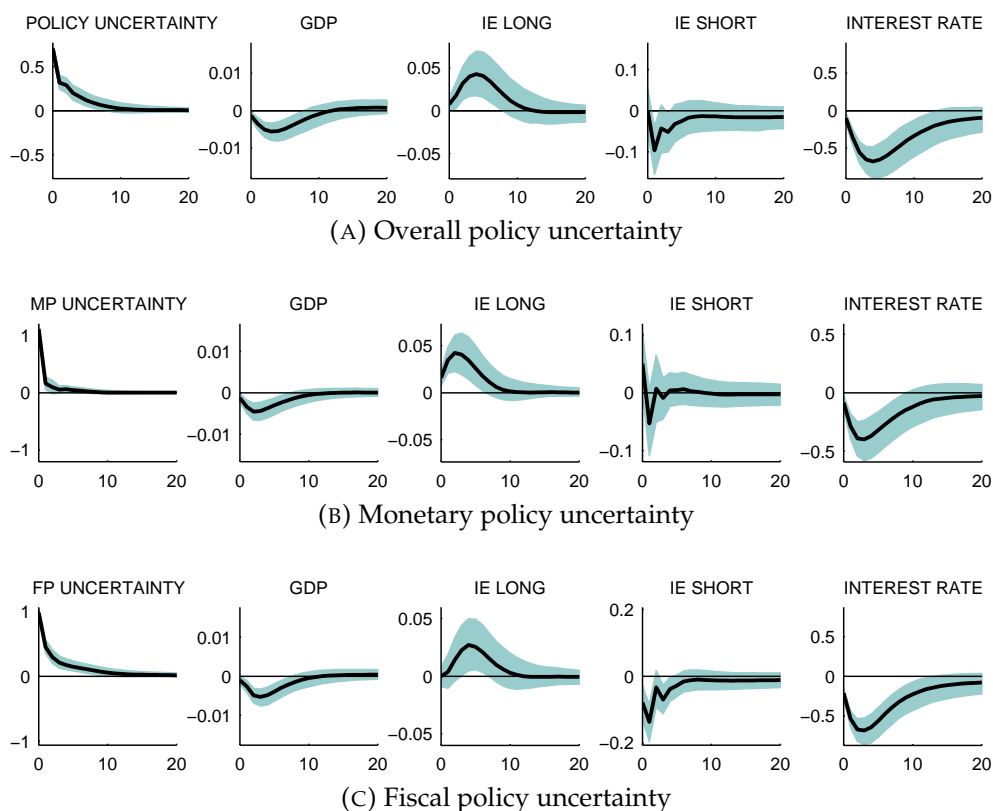
If the prior is described by  $\bar{\Theta}_0$ ,  $N_0$ ,  $S_0$  and  $\nu_0$ , then the posterior is described by  $\bar{\Theta}_T$ ,  $N_T$ ,  $S_T$  and  $\nu_T$  where

$$\begin{aligned}
 \nu_T &= T + \nu_0, \\
 N_T &= N_0 + X'X, \\
 \bar{\Theta}_T &= N_T^{-1}(N_0\bar{\Theta}_0 + X'X\hat{\Theta}), \\
 S_T &= \frac{\nu_0}{\nu_T}S_0 + \frac{T}{\nu_T}\hat{\Sigma} + \frac{1}{\nu_T}(\hat{\Theta} - \bar{\Theta}_0)'N_0N_T^{-1}X'X(\hat{\Theta} - \bar{\Theta}_0).
 \end{aligned} \tag{10}$$

Using a weak prior with  $N_0 = 0$ ,  $\nu_0 = 0$ ,  $S_0$  and  $\bar{\Theta}_0$  being arbitrary, then the posterior is characterized by  $N_T = X'X$ ,  $\nu_T = T$ ,  $S_T = \hat{\Sigma}$  and  $\bar{\Theta}_T = \hat{\Theta}$ .

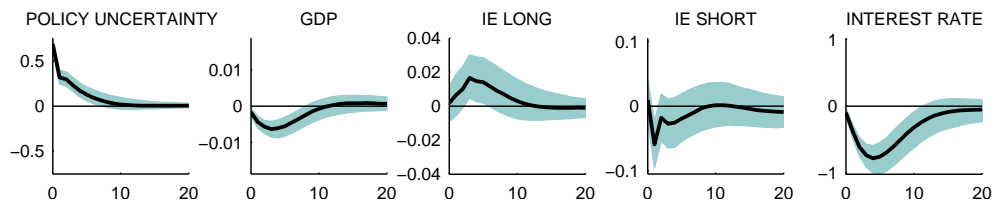
## APPENDIX D. RESULTS

FIGURE 11. IRFs to EPU shocks for the panel-BVAR with CE expectations

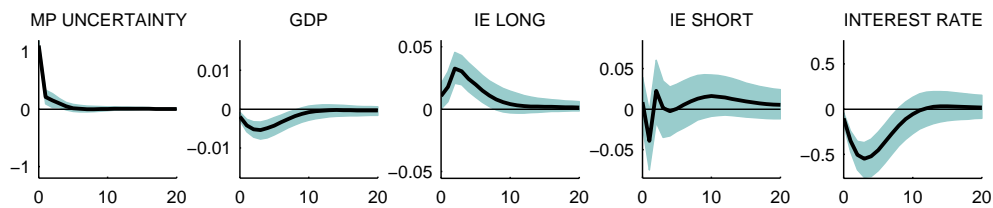


*Notes:* The solid line in black denotes median impulse response from the estimated VAR(2) for the US - euro area panel and the shaded area the corresponding 68 percent error band. BVARs include a constant and an exogenous variable, log level of crude oil prices. Policy uncertainty and GDP are in log levels. IE Long and IE Short represent five- and one- year ahead inflation expectations, in percent. Source of inflation expectations: Consensus Economics. Period: 1999Q1-2012Q3. Horizontal axis is lag horizon in quarters.

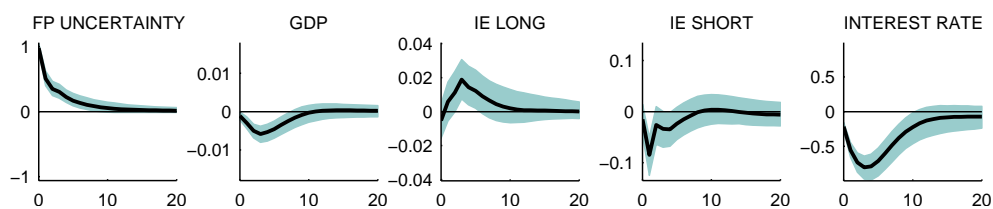
FIGURE 12. IRFs to EPU shocks for the panel-BVAR with SPF expectations



(A) Overall policy uncertainty



(B) Monetary policy uncertainty

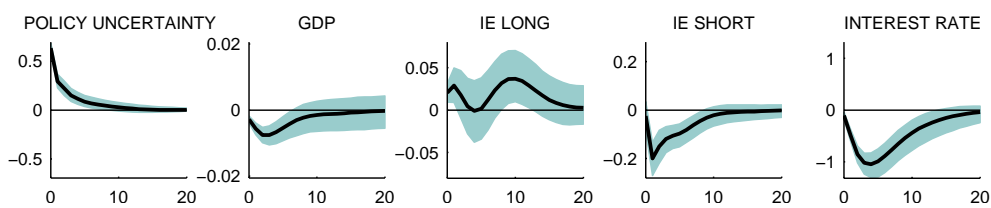


(C) Fiscal policy uncertainty

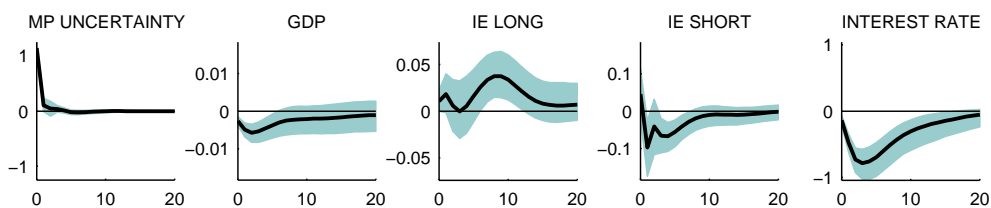
*Notes:* The solid line in black denotes median impulse response from the estimated VAR(2) for US - euro area panel and the shaded area the corresponding 68 percent error band. SVARs include an exogenous variable, log level of crude oil prices. Policy uncertainty and GDP are in log levels. IE Long for the US corresponds to ten years ahead inflation expectations while for the euro area it represents five years ahead inflation expectations. In both cases, IE Short represents one year ahead inflation expectations, in percent. Source of inflation expectations: SPF of the Fed Philadelphia and of the ECB. Period: 1999Q1-2012Q3. Horizontal axis is lag horizon in quarters.

## APPENDIX E. ROBUSTNESS

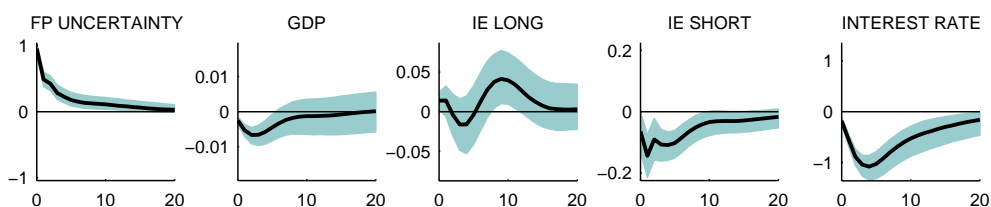
FIGURE 13. IRFs to EPU shocks for the US with CE expectations



(A) Overall policy uncertainty



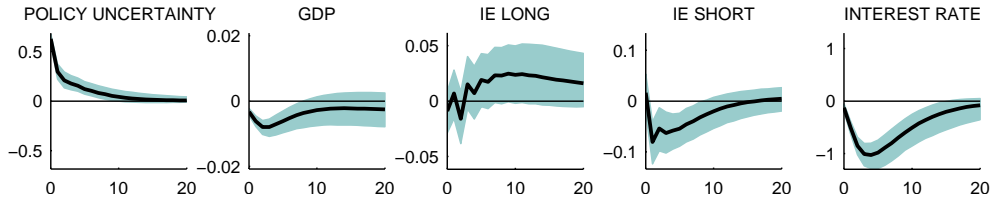
(B) Monetary policy uncertainty



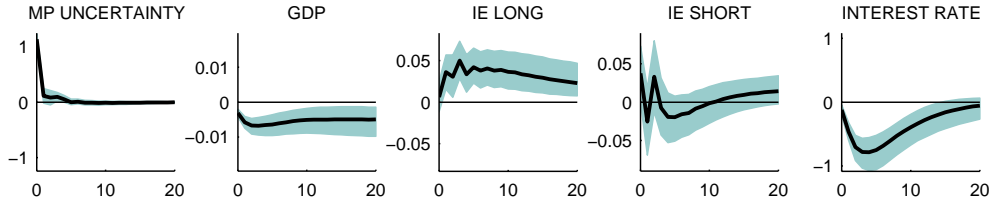
(C) Fiscal policy uncertainty

Notes: The solid line in black denotes median impulse response from the estimated VAR(2) and the shaded area the corresponding 68 percent error band. SVARs include an exogenous variable, log level of crude oil prices. Period: 1991Q4-2012Q3. Source of inflation expectations: Consensus Economics. Policy uncertainty and GDP are in log levels. IE Long corresponds to five years ahead inflation expectations and IE Short represents one year ahead inflation expectations, in percent. Horizontal axis is lag horizon in quarters.

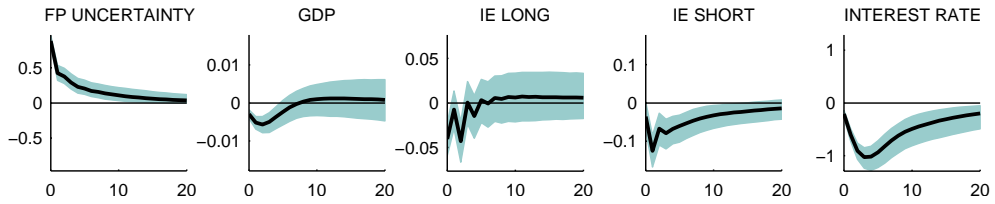
FIGURE 14. IRFs to EPU shocks for the US with SPF expectations



(A) Overall policy uncertainty



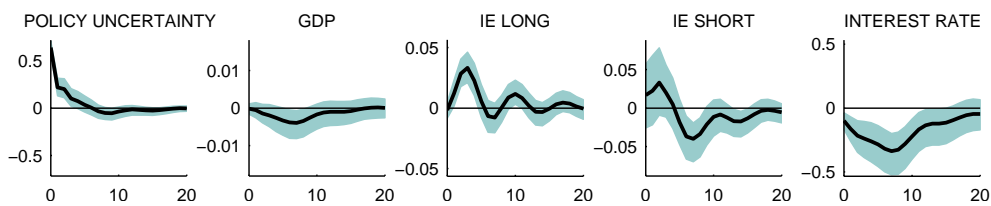
(B) Monetary policy uncertainty



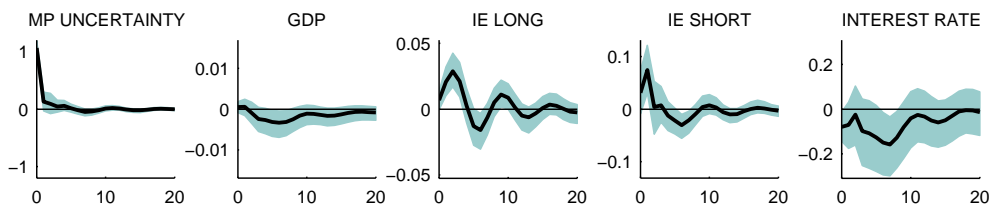
(C) Fiscal policy uncertainty

Notes: The solid line in black denotes median impulse response from the estimated VAR(2) and the shaded area the corresponding 68 percent error band. SVARs include an exogenous variable, log level of crude oil prices. Period: 1991Q4-2012Q3. Source of inflation expectations: SPF of the Fed of Philadelphia. Policy uncertainty and GDP are in log levels. IE Long corresponds to inflation expectations over the next ten years and IE Short represents one year ahead inflation expectations, in percent. Horizontal axis is lag horizon in quarters.

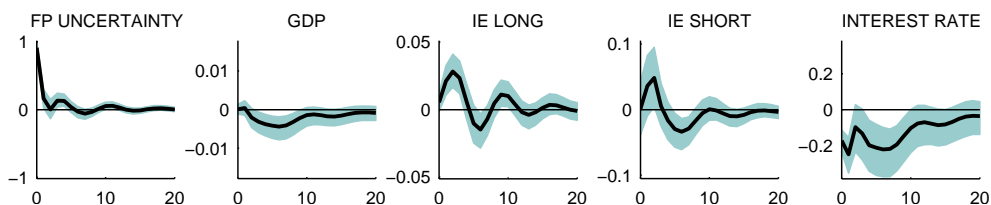
FIGURE 15. IRFs to EPU shocks for the euro area with CE expectations



(A) Overall policy uncertainty



(B) Monetary policy uncertainty

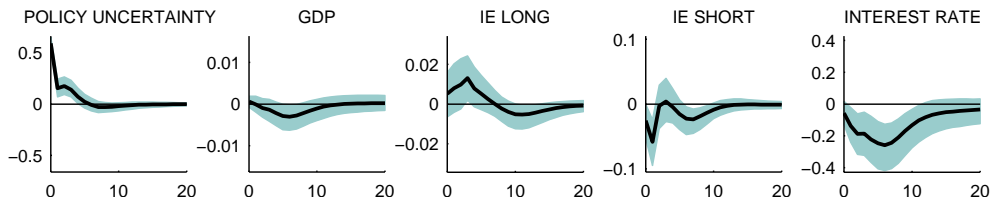


(C) Fiscal policy uncertainty

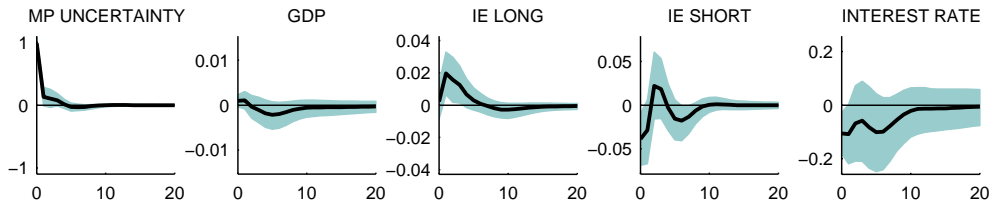
Notes: The solid line in black denotes median impulse response from the estimated VAR(2) and the shaded area the corresponding 68 percent error band. SVARs include an exogenous variable, log of industrial production of US. Period: 1999Q1-2012Q3. Source of inflation expectations: Consensus Economics. Policy uncertainty measures and GDP are in log levels. IE Long corresponds to five years ahead inflation expectations and IE Short represents one year ahead inflation expectations, in percent. Horizontal axis is lag horizon in quarters.



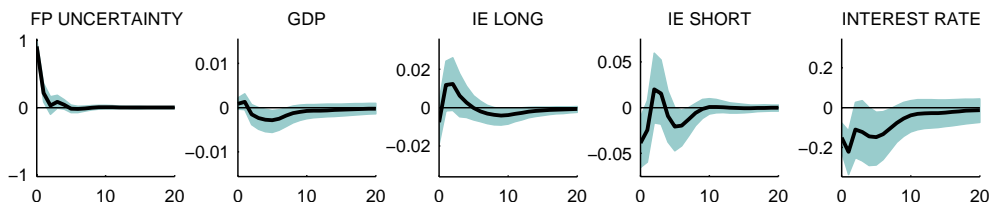
FIGURE 16. IRFs to EPU shocks for the euro area with SPF expectations



(A) Overall policy uncertainty



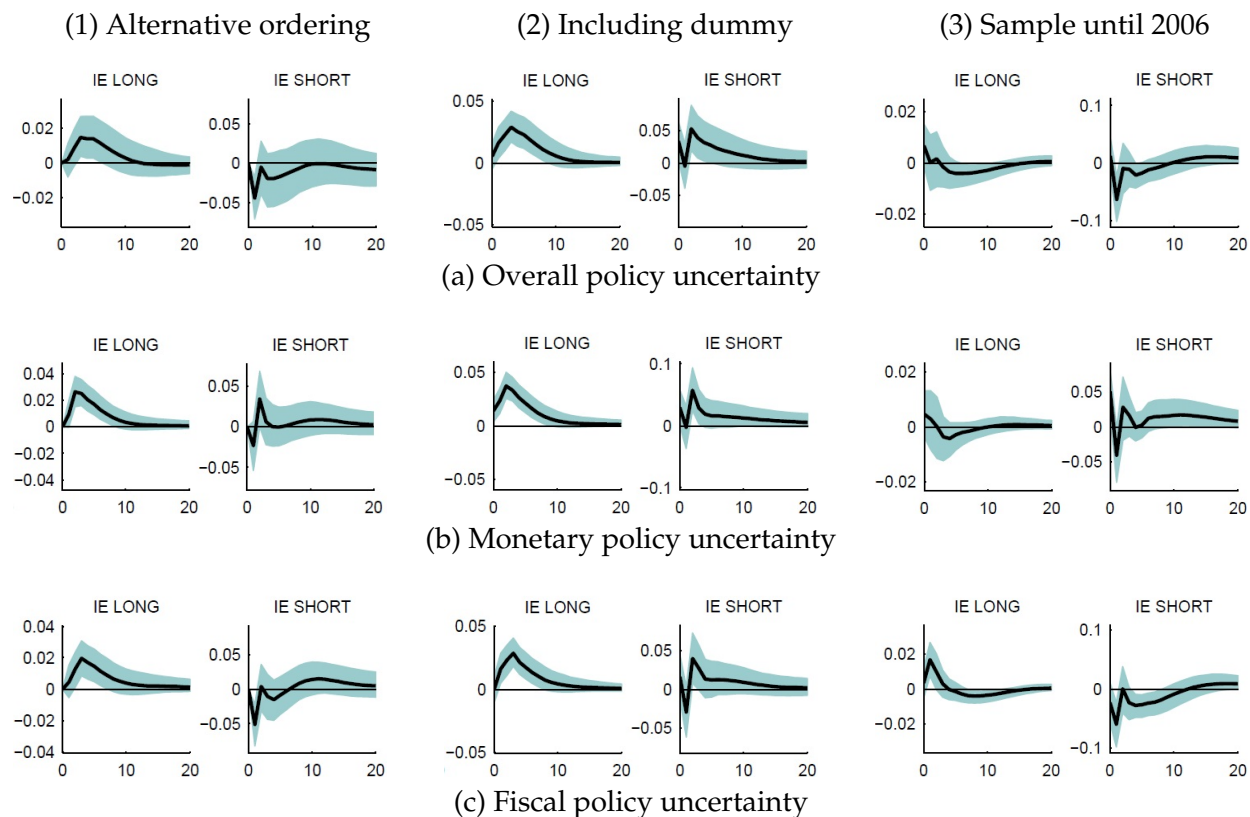
(B) Monetary policy uncertainty



(C) Fiscal policy uncertainty

*Notes:* The solid line in black denotes median impulse response from the estimated VAR(2) and the shaded area the corresponding 68 percent error band. SVARs include an exogenous variable, log level of US industrial production. Period: 1999Q1-2012Q3. Source of inflation expectations: SPF of the ECB. Policy uncertainty and GDP are in log levels. IE Long corresponds to five years ahead inflation expectations and IE Short represents one year ahead inflation expectations, in percent. Horizontal axis is lag horizon in quarters.

FIGURE 17. IRFs of inflation expectations to EPU shocks for the panel-BVAR with SPF expectations



Notes: The solid line in black denotes median impulse response from the panel-BVAR(2), with  $y_t = (pu_t, gdp_t, ie_{long|t}, ie_{short|t}, i_t)$ , a constant and log level of crude oil prices as an exogenous variable. The shaded area corresponds to the 68 percent credible set (posterior distribution). Policy uncertainty and GDP are in log levels. IE Long for the US corresponds to ten years ahead inflation expectations while for the euro area it represents five years ahead inflation expectations. In both cases, IE Short represents one year ahead inflation expectations, in percent. The period considered in the estimation: 1999Q1-2012Q3. Horizontal axis is lag horizon in quarters. We show the results of three robustness checks: (1) reordering the endogenous variables,  $y_t = (gdp_t, ie_{long|t}, ie_{short|t}, i_t, pu_t)$ ; (2) including a dummy that takes the value of one starting from 2008Q4; (3) splitting the sample until 2006Q4.

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