Economic Policy Uncertainty and Inflation Expectations

Klodiana Istrefi and Anamaria PiloIU

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The views expressed herein are those of the authors and should under no circumstances be interpreted as reflecting those of the Banque de France or the Eurosystem.

Key Question

Is there an effect of policy-related uncertainty on inflation expectations?

Motivation

- High levels of uncertainty, with policy uncertainty being a prominent contributor;
- Policy uncertainty has negative effects on economic activity;
- However, not much known if such uncertainty affects beliefs and perceptions about policy, inflation expectations;
- Long-term inflation expectations, information about the extent to which a central bank's commitment to price stability is perceived as credible.

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What we do

- Highlight a new channel through which policy uncertainty can affect the macroeconomy.
- Study the link between policy-related uncertainty and inflation expectations.
- Bayesian Panel VAR (US and the euro area).
- Economic Policy Uncertainty index of Baker, Bloom and Davis (2012).
- Identify policy uncertainty shocks.

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- Given a policy uncertainty shock:
 - economy contracts, short-term inflation expectations and interest rate fall;
 - long-term inflation expectations rise;
- Monetary and fiscal policy uncertainty, both important;
- Results robust to several specifications.

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- ✓ Fernandez-Villaverde et al. (2013), Born and Pflafer (2014)
- ✓ Baker et al. (2012), Mumtaz and Zanetti (2013)

2 Inflation expectations

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Our paper, first empirical evidence on the effect of:

- **policy-related uncertainty shocks on inflation expectations.**
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Measuring policy-related uncertainty

- Economic Policy Uncertainty (EPU) index from Baker, Bloom and Davis (2012).
- News-based EPU for US and the euro area:

- Evaluations: Human News Audit (corr. 0.76), Beige Book (corr. 0.8).

Data and Model specification

- Panel BVARs for US and euro area with, $y_{i,t} = \begin{pmatrix} epu_{i,t} \\ gdp_{i,t} \\ \pi_{i,long|t}^e \\ \pi_{i,short|t}^e \\ i_{i,t} \end{pmatrix}$

where:

- epu_t , news-based EPU (**data**);
 - gdp_t , real GDP, seasonally adjusted;
 - $\pi_{long|t}^e$, 5 to 10 years ahead inflation expectations;
 - $\pi_{short|t}^e$, one year ahead inflation expectations;
 - i_t , short-term interest rate.
- Recursive identification ($epu_t, gdp_t, \pi_{long|t}^e, \pi_{short|t}^e, i_t$).
 - ✓ EPU reacts on impact only to its own innovations.
 - ✓ an innovation to EPU can have an immediate effect on the variables ordered after.

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Data and Model specification

- We study variations for:
 - News-based:
 - ▶ overall policy uncertainty
 - ▶ monetary policy uncertainty
 - ▶ fiscal policy uncertainty
 - Sources for inflation expectations:
 - ▶ Consensus Economics
 - ▶ SPF of Fed Philadelphia and of ECB
- Sample: 1999Q1-2012Q3. Quarterly frequency.
- Optimal lag selection with BIC. Lag selected 2.
- Flat prior, as in Uhlig (2005).

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- IRFs of long- and short-term inflation expectations for:
 - ✓ Different sources of inflation expectations.
 - ✓ Specific type of policy uncertainty shock.
- Contribution of policy uncertainty shocks to long-term inflation expectations (FEVD).

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IRFs to policy uncertainty shock, CE expectations

(a) Overall policy uncertainty

- Given two standard deviation innovation in EPU:
 - ✓ Long-term inflation expectations rise.
 - ✓ Short-term expectations fall.
- Policy uncertainty shocks in our sample three to four st. deviations.
 - ✓ Long-term inflation expectations rise up to 10 bp.
 - ✓ Sufficient to miss the ECB's "below, but close to, 2%" or Fed's 2% inflation objective.

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IRFs of inflation expectations

Consensus Economics

Survey of Professional Forecasters

(a) Overall policy uncertainty

(b) Monetary policy uncertainty

(c) Fiscal policy uncertainty

Contribution of policy uncertainty shocks

Table: FEVD (posterior median) of long-term inflation expectations

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

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

Robustness checks

1 Assumptions for identification

- Order EPU index last **Re-ordering**

2 Selected sample

- Exclude the recent crisis **Sample2006**
- Exclude or dummy for period with unconventional MP **Dummy**

3 A different proxy for uncertainty, **VIX**

4 Individual VARs **BVAR US** **BVAR EA**

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In response to policy uncertainty shocks:

- Long-term inflation expectations increase.
 - ✓ New empirical result.
 - ✓ Monetary policy uncertainty not always the reason.
 - ✓ Up to 17% of its variance explained.
- Economy contracts.
 - ✓ In line with previous work in literature.
 - ✓ Monetary and fiscal policy uncertainty equally harmful.
- Results are robust.
- The effects are stronger for the US.

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Thank you for your attention!

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Reordering 2: IRFs to policy uncertainty shocks for the panel-BVAR with CE expectations

(g) Overall policy uncertainty

(h) Monetary policy uncertainty

(i) Fiscal policy uncertainty

(j) Overall policy uncertainty

(k) Monetary policy uncertainty

(l) Fiscal policy uncertainty

(m) Overall policy uncertainty

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IRFs to VIX uncertainty shocks for the panel-BVAR

(p) CE Panel

(q) SPF Panel

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Bayesian Estimation (1)

Let $k = np + m + 1$ and $\Theta_{(k \times n)} = (A_0, A_1, \dots, A_p, B_0)'$. Define:

$$Y_{(T \times n)} = \begin{bmatrix} y_1' \\ y_2' \\ \dots \\ y_T' \end{bmatrix}, \quad X_{(T \times k)} = \begin{bmatrix} x_1 \\ x_2 \\ \dots \\ x_T \end{bmatrix}, \quad x_t = (1, y_{t-1}', \dots, y_{t-p}', z_t') \quad \text{and} \quad U_{(T \times n)} = \begin{bmatrix} u_1' \\ u_2' \\ \dots \\ u_T' \end{bmatrix}. \quad (1)$$

The VAR can be conveniently rewritten as:

$$Y = X\Theta + U. \quad (2)$$

The likelihood function of (Θ, Σ) based on Y is:

$$p(Y|\Theta, \Sigma) \propto \frac{1}{|\Sigma|^{T/2}} \times \exp \left\{ -\frac{1}{2} \text{trace}[\Sigma^{-1} \hat{S}] \right\} \\ \times \exp \left\{ -\frac{1}{2} \text{trace}[\Sigma^{-1} (\Theta - \hat{\Theta})' X' X (\Theta - \hat{\Theta})] \right\}, \quad (3)$$

where

$$\hat{\Theta} = (X'X)^{-1}(X'Y) \quad \text{and} \quad \hat{\Sigma} = \frac{1}{T}(Y - X\hat{\Theta})'(Y - X\hat{\Theta}) \quad (4)$$

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

Bayesian Estimation (2)

Our prior and posterior for (Θ, Σ) belong to the Normal-Whishart family. If the prior is described by $\bar{\Theta}_0$, N_0 , S_0 and ν_0 , then the posterior is described by $\bar{\Theta}_T$, N_T , S_T and ν_T where

$$\begin{aligned}\nu_T &= T + \nu_0, \\ N_T &= N_0 + X'X, \\ \bar{\Theta}_T &= N_T^{-1}(N_0\bar{\Theta}_0 + X'X\hat{\Theta}), \\ S_T &= \frac{\nu_0}{\nu_T}S_0 + \frac{T}{\nu_T}\hat{\Sigma} + \frac{1}{\nu_T}(\hat{\Theta} - \bar{\Theta}_0)'N_0N_T^{-1}X'X(\hat{\Theta} - \bar{\Theta}_0).\end{aligned}\tag{5}$$

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 $\bar{\Theta}_T = \hat{\Theta}$.

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Evaluation of the policy uncertainty index

- EPU index is a proxy variable and subject to measurement errors. It is often questioned whether it is just another measure of the state of the economy or whether it suffers from political slant.
- Baker, Bloom and Davis (2012) evaluate the index in several ways and argue that these errors **do not undermine the accuracy of the index**.
 - 1 Strong correlation between the computerized newspaper component of the EPU index and a measure of what a human reader would call economic policy uncertainty.
 - 2 EPU index 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.
 - 3 EPU index does not appear to be strongly affected by newspaper political slant.

The VIX is highly correlated with a news index of equity market uncertainty

Notes: Frequency of the triple of "economy/economic", "uncertain/uncertainty" and one of a collection of financial market terms (stock price, equity price, stock market) in 10 major US papers and normalized by the total number of articles, by month and paper. Both series scaled to same mean. Each series set to mean of 100 over entire period.

Source: Baker, Bloom and Davis (2012).

Inflation expectations

- With respect to the general public only short-term inflation expectations are available
- Long-term inflation expectations can profoundly influence current macroeconomic behavior
 - ✓ Closely monitored by monetary authorities
 - ✓ Well anchored long-term inflation expectations crucial indicator of central bank credibility
 - ✓ Key to the well functioning of the monetary policy transmission mechanism
- Different measures of long-term inflation expectations:
 - ✓ Survey-based measures (surveys of professional forecasters)
 - ✓ Financial market-based measures (Break Even Inflation Rates)
- We use the survey-based measures of long-term inflation expectations

Measuring inflation expectations

Inflation Expectations SPF median (short-term)

Inflation Expectations SPF median (long-term)

Inflation Expectations CE (short-term)

Inflation Expectations CE (long-term)

News-based EPU

- Automated search; an article must include terms pertaining to:

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- 3 policy

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