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Subjective interest rate uncertainty and the macroeconomy: a cross-country analysis

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We present a measure of subjective interest rate uncertainty and explore its effects on the economy for G7 countries and Spain, during the period 1993-2015. This measure is a summary of uncertainty among professional forecasters over the future level of interest rates. We find that subjective interest rate uncertainty is harmful to the economy, with both recessionary and deflationary effects. These effects vary across countries in terms of magnitude and persistence. Differences in economic structures and institutional frameworks can explain this heterogeneity. Central banks can play an important role in mitigating interest rate uncertainty by designing strategies to enhance transparency and communication.

In response to the 2008 financial crisis, major central banks cut their policy rates to unprecedented low levels and have kept them “low for long”. As economies recover, markets are forming expectations on the timing and size of future interest rate increases. For instance, in the United States, speculation about the normalisation of interest rates intensified as of late-2014, increasing interest rate uncertainty well before the Fed actually raised its policy rate in December 2015. This has since been followed by three further hikes – the latest in June 2017. For the euro area and the United Kingdom, markets anticipate that policy rates will remain at their current level for at least several quarters.¹

Central banks pay close attention to perceived uncertainty over interest rates and often refine their language to manage expectations. Specific examples include the 2013 tapering episode in the United States or the sell-off episode in the euro area in April 2015. In the former case, for instance, the Fed strongly reaffirmed that its forward guidance on interest rates would remain relevant, despite discussions over the pace of its asset purchases.² It is therefore important to quantify the economic effects of interest rate uncertainty. In this *Rue de la Banque*, we explore this issue in a cross-country analysis for the period 1993-2015.

How do we measure interest rate uncertainty?

We base our measure of interest rate uncertainty on interest rate forecasts from Consensus Economics (CE) surveys. These surveys poll both public and private economic institutions, including investment banks and advisory firms, in various countries. They are published on a monthly basis. CE surveys contain individual forecaster's point estimates for various different macroeconomic variables. We focus on the forecasts for interest rates. In these surveys, professional forecasters are asked to provide their estimates for 3-month and 10-year interest rates, 3 and 12 months ahead.

Using these interest rate forecasts and actual observed rates, we construct our measure of interest rate uncertainty as the sum of two components: i) disagreement between forecasters; and ii) the variability of average forecast errors, as explained below.³

¹ For instance, according to Bloomberg, markets do not expect the ECB to increase interest rates before mid-2018 (Source: <https://www.bloomberg.com/news/articles/2017-03-08/ecb-preview-market-betting-for-2018-rate-rise-seen-as-premature>).

² See FOMC Meeting Statement released on 19 June 2013.

³ This methodology is in line with Lahiri and Sheng (2010).

i) **Disagreement between forecasters.** Professional forecasters have different views on the level of future economic variables, including interest rates. For example, even if their assessment of future interest rates is based on the same publicly available data, forecasters can interpret the data in different ways, leading to different predictions. Technically, we measure disagreement over the interest rate as the dispersion (i.e. variance) in survey respondents' forecasts for future interest rates.

ii) **The variability of average forecast errors.** This component exploits forecast errors, which are the differences between actual and predicted interest rates. We use the variability (i.e. conditional variance) of average forecast errors to assess how difficult it is for all forecasters to predict future interest rates.

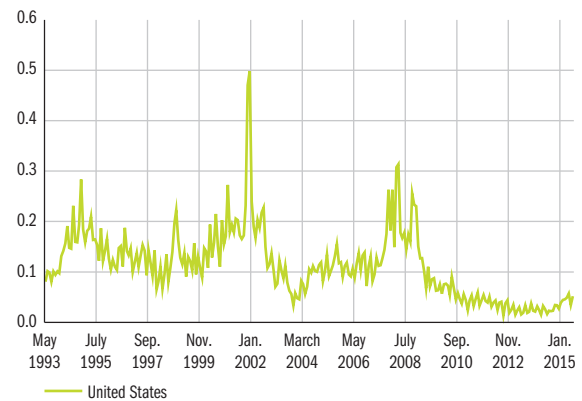
Based on this definition, we construct measures of short-term and long-term subjective interest rate uncertainty for a range of advanced economies, for the period 1993-2015. In this *Rue de la Banque* we concentrate on the results for short-term interest rate uncertainty.

Chart 1 shows the evolution of short-term uncertainty for the United States and the four biggest euro area economies.⁴ These measures fluctuate substantially over time. In all countries, interest rate uncertainty spikes during the Great Recession of 2008. There is also substantial variation between countries. For instance, the United States displays high levels of interest rate uncertainty in the period after the dot-com bubble and the September 11 attacks, in the early 2000s. For the euro area, although magnitudes differ, the pattern of interest rate uncertainty among member countries is relatively similar as uncertainty is measured in relation to the interbank rate (starting January 1999) which is the same for all countries.

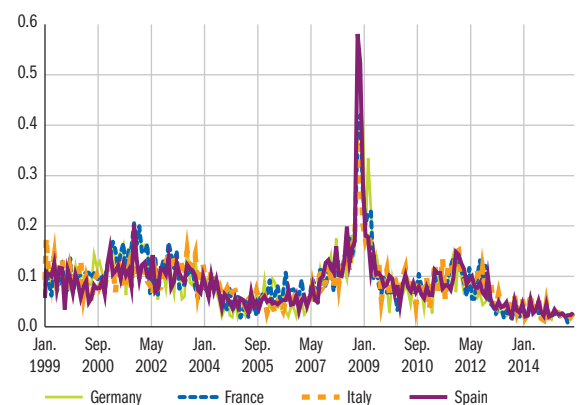
Chart 1 also shows that interest rate uncertainty is at its lowest level towards the end of our sample period. Specifically, interest rate uncertainty is low from end-2008 onwards for the United States, and from mid-2013 onwards for the euro area. During these periods, policy rates reached levels close to zero and central banks communicated forward guidance indicating that they would keep their respective policy rates low for a long time.⁵

C1 Subjective interest rate uncertainty in the United States and the euro area

3-month Treasury bill rate uncertainty



3-month interbank rate (Euribor) uncertainty



Source: Istrefi and Mouabbi, forthcoming.

How does subjective interest rate uncertainty compare with other uncertainty measures?

Interest rate uncertainty is particularly interesting as it is multi-faceted. For instance, it can be related to uncertainty about monetary policy as interest rates play a key role

⁴ Results for the remaining countries are available in Istrefi and Mouabbi (forthcoming).

⁵ Forward guidance communication by the Fed has undergone several changes, ranging from open-ended to state-dependent formulations.

in the transmission of monetary policy decisions to the economy. Moreover, insofar as financial behaviours affect risk premia, interest rate uncertainty can also be seen to reflect financial uncertainty.

In Chart 2 we compare our measure of short-run interest rate uncertainty (the green lines) with other well-known measures of uncertainty (the blue lines), specifically for the United States. These other measures include stock market implied volatility (VIX), monetary policy uncertainty based on the frequency of newspaper articles referring to monetary policy uncertainty (MPU), and two measures of macroeconomic and financial uncertainty representing common uncertainty stemming from several macro and financial variables, respectively.⁶

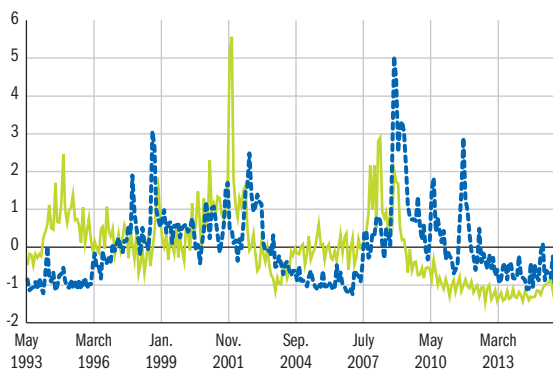
Several observations stand out. First, interest rate uncertainty co-moves with macro uncertainty for most of our sample period. This suggests that interest rate

uncertainty relates to uncertainty over the macroeconomic inputs that usually guide monetary policy (e.g. inflation and output). Furthermore, our measure co-moves with the MPU, suggesting that interest rate uncertainty is a good proxy for monetary policy uncertainty. A divergence between these two measures is observed after 2008, as policy rates reached levels close to zero and the Fed communicated forward guidance indicating rates would remain “low for long”. In contrast, post-2008, high levels of MPU reflect uncertainty over the quantitative easing programmes, the taper tantrum and expectations of a lift-off. Lastly, interest rate uncertainty is less close to the VIX and to financial uncertainty for most of our sample period.

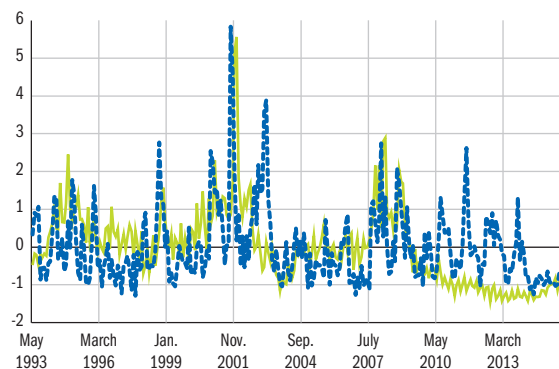
⁶ The MPU measure as constructed in Baker, Bloom and Davis (2015), and measures of macroeconomic and financial uncertainty, as in Jurado, Ludvigson and Ng (2015) and Ludvigson, Ma and Ng (2015).

C2 Subjective interest rate uncertainty vs. other uncertainty measures in the United States

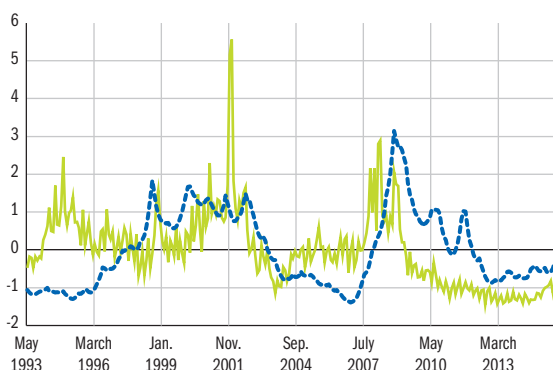
a) VIX



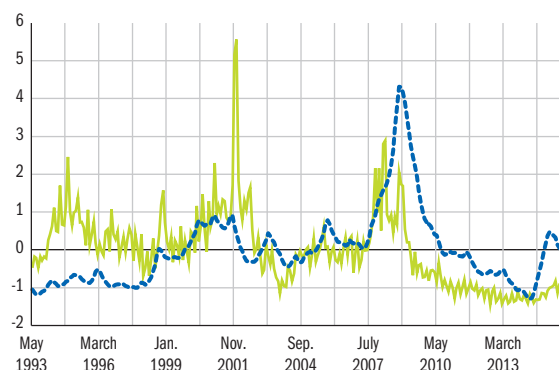
b) Monetary policy uncertainty (MPU)



c) Financial uncertainty



d) Macroeconomic uncertainty



— Interest rate uncertainty

- - - Other measures of uncertainty

Source: Istrefi and Mouabbi, forthcoming.

Note: Our subjective interest rate uncertainty measure for the United States refers to the 3-month yield, at a 3-month forecasting horizon. All measures are standardised.

How does (short-term) interest rate uncertainty affect the economy?

To answer this question we use Vector Autoregressive (VAR) models, which are widely used to capture interdependencies between numerous economic variables. As is standard for these models, we have to make certain assumptions about the causal structure of the data under investigation. Our assumption is that transitory movements in the interest rate uncertainty variable can have an immediate effect on the other economic variables in the model but not vice versa. This assumption is consistent with the timing of the surveys and of the publication of statistics on economic activity.

Our VAR estimations include the following variables: the interest rate uncertainty measure; the (log) of the industrial production index (IP); the CPI inflation rate; producer price (PP) inflation; the (log) of retail trade; and the unemployment rate. We summarise the impact of interest rate uncertainty with impulse response functions (hereafter the response). These trace the effect of a one-period shock to short-term interest rate uncertainty on the current and future values of the variables under analysis.⁷

In Chart 3, we show the median responses of our macro variables to short-term interest rate uncertainty shocks for several countries. We observe that shocks to interest rate uncertainty are recessionary: they reduce industrial production and CPI inflation and increase unemployment. These effects are persistent and the variables take between three and five years to return to their initial levels.

In terms of quantitative effects, there is substantial heterogeneity across countries. For interest rate uncertainty shocks of the size observed during the recent crisis, production drops by 0.4-3.8%, in the year the shock hits. In response to this uncertainty, unemployment worsens, with rates increasing by between 0.2 and 1.2 percentage points. In addition, CPI inflation falls by up to 1 percentage point. If we look at the disaggregated components of uncertainty (disagreement and the variability of the average forecast errors), we find that they push the economy in the same direction.

In terms of the importance of these shocks, we find that short-term interest rate uncertainty explains between 42% and 59% of the variation in industrial

production in euro area countries (except Italy). Regarding unemployment, the contribution is substantial, reaching up to 43%. These results indicate that subjective interest rate uncertainty has a significant quantitative impact, which could indirectly reflect the effect of the macroeconomic or financial uncertainties captured by this measure, as shown in Chart 2. Japan and Italy are two examples where interest rate uncertainty shocks do not seem to have a major impact.

What could explain this heterogeneity? We look at two potential causes that relate to the particular characteristics of the economies under investigation.⁸ We find that countries with a larger share of manufacturing display stronger declines in industrial production in response to short-term interest rate uncertainty. This is in line with the fact that manufacturing activity is based on long-term projects that are sensitive to interest rate changes. Furthermore, countries with more rigid labour indicators tend to experience stronger declines in industrial production in response to interest rate uncertainty. Labour market rigidities impose higher hiring and firing costs on firms. Therefore, when coupled with uncertainty, the impact on the economy is more adverse.

Overall, our paper shows that interest rate uncertainty has large negative effects on the economy, and that these effects are stronger in some countries than in others. Our results highlight the importance of economic structures and institutional frameworks in propagating uncertainty shocks.

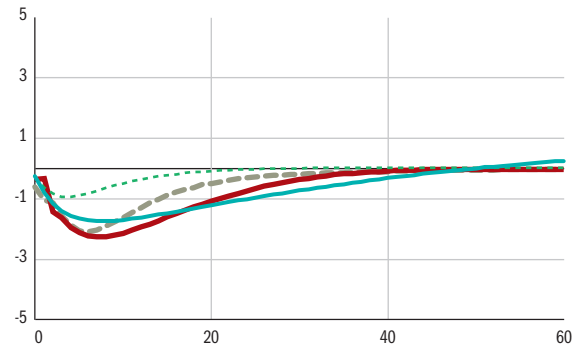
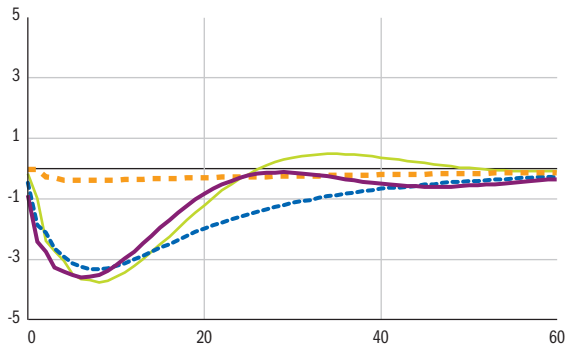
Moreover, these findings draw attention to the role of central banks. Insofar as interest rate uncertainty relates to uncertainty about monetary policy, then central banks can help to mitigate it by designing appropriate operational frameworks and strategies. Moreover, insofar as interest rate uncertainty stems from economic fundamentals, central banks can also play an active role in keeping it contained. Indeed, during the Great Recession, many central banks across the world took this position, and communicated policies that reduced uncertainty over the path of short-term interest rates (i.e. forward guidance).

⁷ The individual VARs also include a constant, a time trend and oil prices as an exogenous variable.

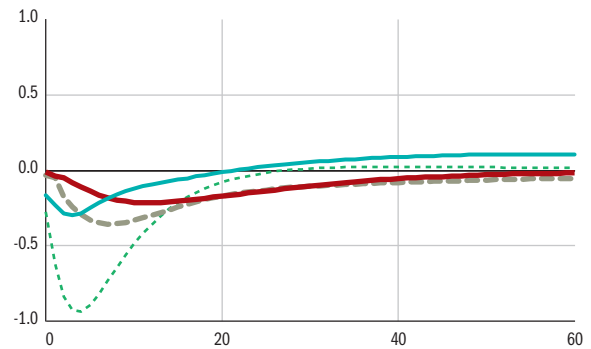
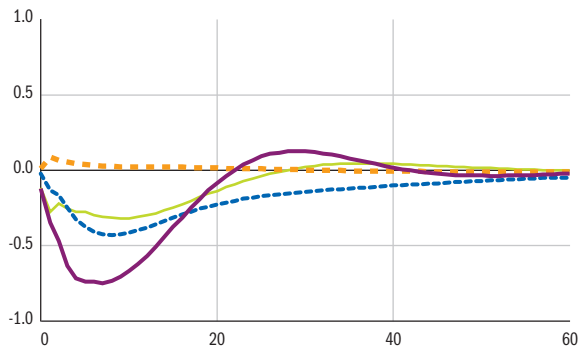
⁸ For further details, refer to Istrefi and Mouabbi (forthcoming).

C3 Responses to a short-term interest rate uncertainty shock across selected countries

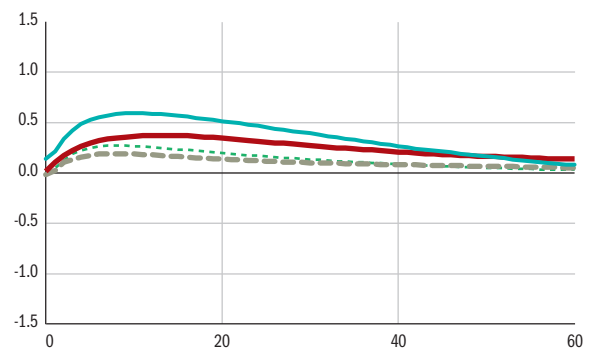
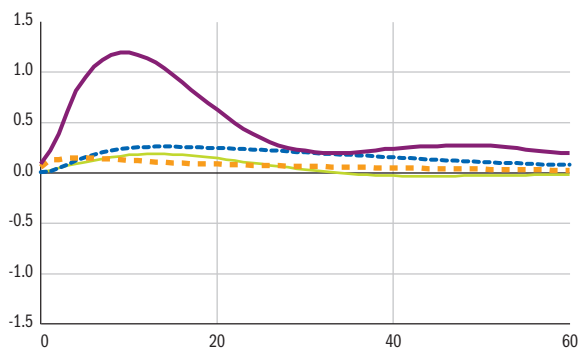
a) Industrial Production
(in %)



b) CPI inflation
(in percentage points)



c) Unemployment
(in percentage points)



— Germany - - - France - - - Italy — Spain

- - - Japan — Canada - - - United Kingdom — United States

Source: Istrefi and Mouabbi, forthcoming.

Note: Responses to uncertainty over the 3-month rate, 3 months ahead. The lines denote the median impulse response. The response of industrial production is in per cent, while the responses of CPI inflation and the unemployment rate are in percentage points. The horizontal axis shows the number of months.

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