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The effect of diverging communication: The case of the ECB and the Bundesbank*

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Abstract

When members of monetary policy committees communicate with the public, the resulting cacophony of voices is often considered a source of confusion. Based on specialized dictionaries, we associate each speech delivered by the presidents of the ECB and the Bundesbank since 2008 with a tone score and construct a measure of diverging tone. Shocks to the tone divergence between the Eurosystem's main protagonists drive volatility, policy uncertainty and risk premia.

Keywords: Central bank communication, diverging tone, speeches, text analysis, monetary transmission

JEL classification: E52, E43, E32

1 Introduction

Members of monetary policy committees communicate with the public and share their views about current and future policy. Often these views diverge among committee members. The conflict between the presidents of the Bundesbank and the ECB is a particularly remarkable case of such a cacophony. This is particularly noticeable as central banks devote many resources to designing a consistent communication strategy.

This paper studies the empirical effect of cacophonous central bank communication. We focus on the diverging tone of speeches delivered by the ECB and the Bundesbank presidents, respectively. Each speech is associated with a tone score, which

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measures the extent of positive or negative sentiment conveyed in the speech. We use standard dictionaries from the literature to calculate this tone score. From the individual tone of the ECB and the Bundesbank presidents we construct a measure of tone divergence. In the second part, we include this divergence measure in a vector autoregression (VAR) model for the euro area. We show that a change in tone divergence raises policy uncertainty, market volatility and interest rate spreads.

Since monetary policy in Europe operates at the effective lower bound on nominal interest rates, central bank communication directed towards managing market expectations is more important than ever (Coenen et al., 2017). Our results suggest that policymakers could reduce market tensions by speaking with one voice. Aligning tones of communication could be a policy tool itself.

The effect is identified by studying a change in divergence for a *given* monetary policy path. A Cholesky identification of the VAR system allows us to impose this restriction. By ordering tone divergence after the current (shadow) short-rate and long-term bond yields incorporating expected future short rates, we study communication shocks for a given current and expected future policy stance.

This paper is the first to show the dynamic effects of diverging tones and the channels through which diverging signals affect markets. A large literature addresses the reception of central bank communication on financial markets. However, this literature is relatively silent on the effects of diverging communication of central bank officials. Tillmann and Walter (2018) show that monetary policy shocks become less effective when the tone divergence is high. In the current paper, however, we study the effects of tone divergence as such, not the interaction with policy shocks.

2 Diverging tone

We use the data set from Tillmann and Walter (2018), which comprises more than 900 speeches delivered by the presidents of the ECB and the Bundesbank.[1] Given that the Bundesbank president has no format available similar to the ECB president's introductory statement at the monthly press conference, we focus on speeches only.[2]

We compute a measure of the "tone" reflected in each speech. The tone reduces the dimensionality of the information contained in each speech to one number. Research by Schmeling and Wagner (2017) and many others has shown that tone as a diffuse concept has effects on asset prices. The Loughran and McDonald (2011) dictionary

[1] Details about the data can be found in Tillmann and Walter (2018).

[2] Tillmann and Walter (2018) show that the tone of the introductory statements is highly correlated with the tone of the speeches given by the ECB president.

is used to classify the tone of each ECB speech, which is available in English.[3] The dictionary is calibrated to measure the positive and negative sentiment conveyed in financial texts. The Bundesbank speeches are available in German. We draw on the Bannier et al. (2018) dictionary of German words, which is an adaptation of the Loughran-McDonald dictionary.[4]

For $i = ECB, BuBa$, we construct a measure of tone as follows

$$tone_t^i = \frac{\#pos_t^i - \#neg_t^i}{\#pos_t^i + \#neg_t^i}, \tag{1}$$

where $\#pos_t$ and $\#neg_t$ is the number of positive and negative words. The higher $tone_t^i$, the more positive is the tone of the speech given by the president of central bank i. The tone measure is bounded between -1 and 1. We will also use a second measure that scales the difference between positive and negative words by the total number of words.

We aggregate $tone_t^i$ to a monthly frequency. If there is more than one speech per month, we use the average sentiment score across speeches. In months without a speech, typically in August, we maintain the sentiment level conveyed by the previous speech, i.e. for August we use the July score. Finally, since the resulting series of tone are very erratic, we use a 12-month moving average of tone for each central bank.[5]

Given the tone scores, we construct a measure of tone divergence,

$$div_t = |tone_t^{ECB} - tone_t^{BuBa}|, \tag{2}$$

which is the absolute difference in the tone scores across both institutions. As we use the absolute difference we remain agnostic about whether a high divergence is due to the ECB being more optimistic or more pessimistic than the Bundesbank. Figure (1) shows the tone for the ECB and the Bundesbank communication, respectively.[6] We find (i) that the tone becomes negative with the outbreak of the financial crisis and (ii) a large and persistent tone gap since 2009. The tone of Bundesbank speeches is markedly more pessimistic than the tone of ECB communication. Figure (2) depicts the corresponding measure of tone divergence.

It is possible that the tone divergence between both central banks reflects the diverging views on the economy in the future. To control for this effect, we regress

[3]For this dictionary, see https://www3.nd.edu/~mcdonald/Word_Lists.html.

[4]This dictionary is available under: https://www.uni-giessen.de/fbz/fb02/forschung/research-clusters/bsfa/textual_analysis.

[5]The data starts in 2007:1, such that the first data point for the moving average is 2008:1.

[6]Both tone series are not independent from one another. We find evidence consistent with the ECB tone Granger-causing the Bundesbank tone, but not vice versa.

tone divergence on a measure of inflation forecast dispersion and a measure of the dispersion of forecasts of future economic activity in the euro area. The residual of this regression is used in an alternative VAR model below. We use the ZEW Financial Market Survey, conducted by the ZEW institute in Mannheim, which asks financial market professions about their qualitative assessment of key future variables. From the relative number of firms who forecast an increase and a decline in activity and inflation, respectively, we calculate forecast dispersion as in Bachmann et al. (2013).

3 Evidence from a VAR model

In order to quantify the effects of a change in tone divergence, we estimate a VAR(q) model. With the help of identifying restrictions as explained below, the VAR model is well suited to address the simultaneous adjustment of the monetary policy stance, the tone of central bank communication and the evolution of the economy. The model is given by

$$Y_t = A_0 + A(L)Y_t + u_t, \quad \text{with } E[u_t u_t'] = \Sigma_u, \tag{3}$$

where $A(L)$ reflects the matrix polynomial in the lag operator of order q and u_t constitutes a white noise process with variance-covariance matrix Σ_u. We also add a vector of constants, A_0, to the model. The vector of endogenous variables, Y_t, is

$$Y_t = \begin{bmatrix} r_t^{shadow} & R_t^{OIS} & div_t & vstoxx_t & epu_t^{ea} & spread_t^{Italy} \end{bmatrix}'. \tag{4}$$

The first variable, r_t^{shadow}, is the Wu and Xia (2016) shadow short rate for the euro area, which reflects the monetary policy stance at the zero lower bound. Above the zero lower bound, we replace this series with EONIA. The two-year OIS rate, R_t^{OIS}, is a longer-term yield which should be most closely related to monetary policy actions. The OIS rate is the safe euro area interest rate and is not affected by risk premia or safe-haven premia.[7]

A structural divergence shock is identified as a change in div_t, our divergence proxy, that does not contemporaneously affect the (shadow) policy rate or the expected future path of the policy rate. For this reason, the divergence proxy is ordered third in the vector Y_t. Hence, we aim at identifying a change in tone divergence for a *given* policy stance. The identification scheme amounts to a Cholesky ordering of the

[7]The OIS rates as well as their decomposition into the expectations component and the term premium are taken from Geiger and Schupp (2018).

variables. The remaining variables are the implied volatility of the euro area stock market as measured by the (log) VSTOXX, $vstoxx_t$, a measure of economic policy uncertainty in the euro area, epu_t^{ea} and the spread between Italian and German government bonds, $spread_t^{Italy}$. The index of policy uncertainty is constructed based on the Baker et al. (2016) Economic Policy Uncertainty indicators for Germany, France, Italy and Spain, using the GDP weights available on the ECB's website.

The sample period for the estimation is 2008M1-2017M2. Since we are particularly interested in the responses of volatility, uncertainty measures and sovereign yield spreads which remained subdued before the financial crisis, we start the estimation in 2008. We estimate the model with $q = 2$ lags and resort to Bayesian estimation. The resulting impulse responses are shown in Figure (3). All figures report the response to an increase in tone divergence by one unit. Since we impose a constraint on the contemporaneous responses of the policy rate and the OIS rate, both do not move on impact. Notably, they exhibit no significant adjustment, even in the subsequent periods. There is only a slight drop in the OIS rate, which suggests that markets anticipate looser monetary policy in the future. This is consistent with the responses of the remaining variables. Equity market volatility increases by 1% following the shock and the interest rate differential between Italian and German government bonds widens. As a consequence of the divergence shock, economic policy uncertainty in the euro area increases by 2%. Here, as in subsequent figures, the results for the two alternative specifications are very similar to the baseline results.

Figure (4) reports the identified divergence shock. The largest, positive shocks occur in 2015, during the discussion about an extension of the ECB's asset purchase program. It is also remarkable that between mid-2013 and mid-2014, we can observe a sequence of negative divergence shocks. This is consistent with the ECB's Forward Guidance policy adopted since June 2013. To support the policy of Forward Guidance, the presidents of the ECB and the Bundesbank apparently aligned the tone of their public speeches.[8]

To corroborate our findings, we report results from alternative specifications in which we substitute selected variables while maintaining the number of six endogenous variables. To assess whether the level of tone contains information relevant for the effects of a divergence shock, we include in the VAR model the average tone of

[8]Interestingly, the *Financial Times* (2014) reports that "Mr Weidmann has ... surprised some on the ECBs Governing Council of late by backing measures such as the strengthening of the banks forward guidance on interest rates. The Bundesbank also claimed it was only the timing of last November's rate cut, not lower borrowing costs in general, that he was against. Yet many believe that Mr Weidmann's shift towards the middle ground is a tactical manoeuvre - a moderation of tone - rather than any real softening of his or the Bundesbank's view."

the ECB and the Bundesbank speeches in a given months, $tone_t^{avg}$. We order this variable third such that we can study the consequences of a divergence shock for a given policy and a given level of optimism or pessimism. The vector of endogenous variables is

$$Y_t^{alt,I} = \begin{bmatrix} r_t^{shadow} & R_t^{OIS} & tone_t^{avg} & div_t & vstoxx_t & epu_t^{ea} \end{bmatrix}'. \tag{5}$$

The impulse response functions, which are not shown to save space, again show a significant increase in market volatility and economic policy uncertainty following a divergence shock. A higher divergence predicts a more pessimistic tone in subsequent months.

In the second specification, we want to see whether divergence shocks also drive the business cycles. We include the unemployment rate and the inflation rate in the euro area, the latter reflecting the year-on-year change in the Harmonized Index of Consumer Prices. These two variables are ordered first as it is standard in the VAR literature. This implies that monetary policy can contemporaneously respond to unemployment and inflation, but not vice versa, i.e.

$$Y_t^{alt,II} = \begin{bmatrix} ur_t & \pi_t & r_t^{shadow} & div_t & epu_t^{ea} & spread_t^{Italy} \end{bmatrix}'. \tag{6}$$

The resulting impulse response functions are shown in Figures (5). A shock to the relative tone of speeches raises unemployment and leads to a fall in inflation. These reactions are consistent with the notion that a larger tone divergence reflects a division in the Governing Council, which in the sample period implies a monetary policy stance that is less expansionary.

In the third alternative, we maintain the business cycle variables and split the OIS yield into the expectations component, R_t^{exp}, and the corresponding term premium, R_t^{tp}. In contrast to the baseline model, the expectations component and the term premium now pertain to securities with a 10-year maturity

$$Y_t^{alt,III} = \begin{bmatrix} ur_t & \pi_t & r_t^{shadow} & div_t & R_t^{exp} & R_t^{tp} \end{bmatrix}'. \tag{7}$$

Since Hansen et al. (2017) find that a transmission of the central bank's 'narratives' happens mostly through the term premium at the long end of the yield curve, we are particularly interested in the response of the term premium. We maintain the ordering of the divergence measure and put the expectations component and the term premium behind div_t.

The resulting impulse response functions are shown in Figures (6). We find a drop in the 10-year OIS expectations component. Following the divergence shock, the cor-

responding term premium increases on impact. An increase in the term premium suggests that the uncertainty about future returns from investing in long-term securities, relative to rolling-over a sequence of investments in short-term securities, increases.

Figure (7) compares the model based on our baseline measure of divergence with two alternative specifications of tone divergence. In the first, we calculate tone based on the number of negative words only as in Schmeling and Wagner (2017). In the second, we express divergence as the simple difference between the ECB's and the Bundesbank's tone, i.e. $div_t = tone_t^{ECB} - tone_t^{BuBa}$. An increase is consistent with the ECB becoming more optimistic than the Bundesbank. For both alternatives, the impulse responses lie in the confidence region around the baseline model. The only exception is the spread response, which is more pronounced if we use negative words only.

4 Conclusions

This paper shows that the divergence in the tone of central bank communication matters. We measure divergence by the absolute distance between the tone conveyed in speeches given by the ECB and the Bundesbank presidents, respectively. A wider divergence of tones leads to an elevated level of policy uncertainty, additional market volatility and higher risk premia in the euro area. Hence, diverging tones of communication of members of monetary policy committees are not innocuous.

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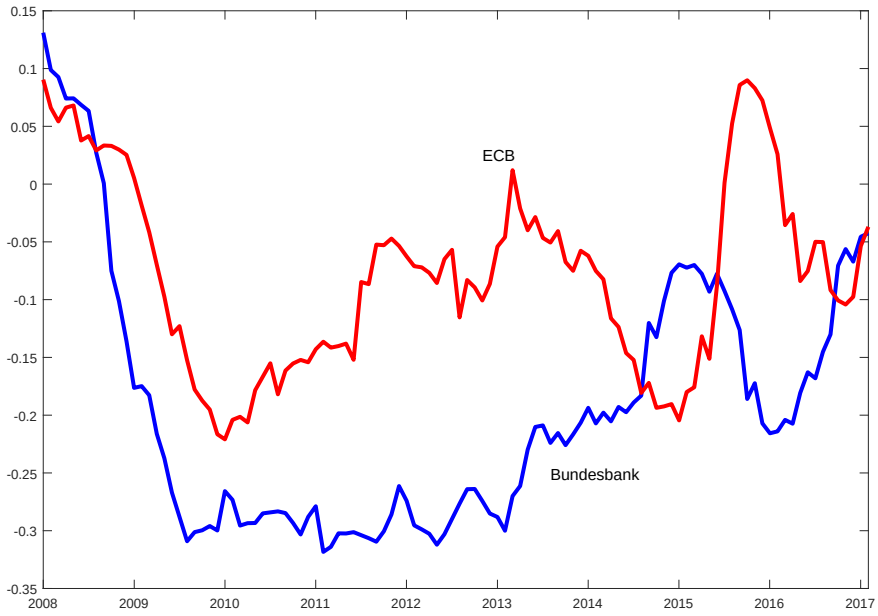
Figure 1: The tone of ECB and Bundesbank speeches

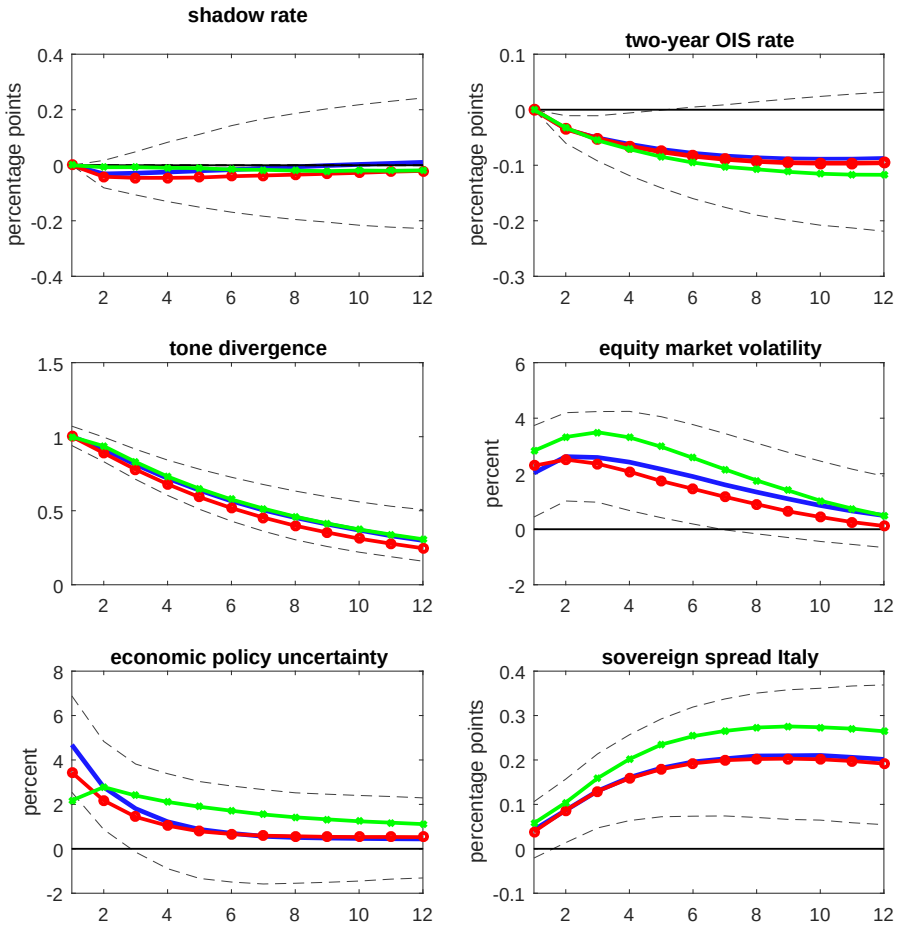


Notes: The graph shows the 12-months moving averages of the $tone_t^i$ series for $i = ECB, BuBa$.

Figure 2: Diverging tone between the ECB and the Bundesbank

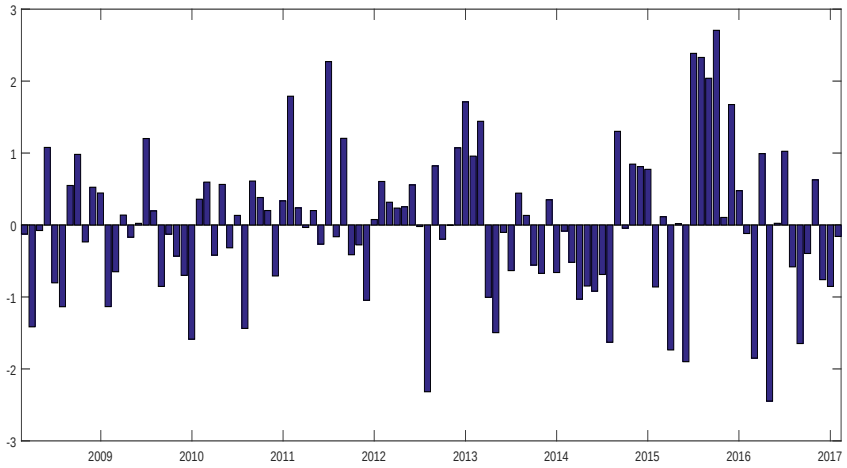
Notes: Divergence measured as the absolute difference of ECB and Bundesbank tone.

Figure 3: Responses to a divergence shock in baseline model



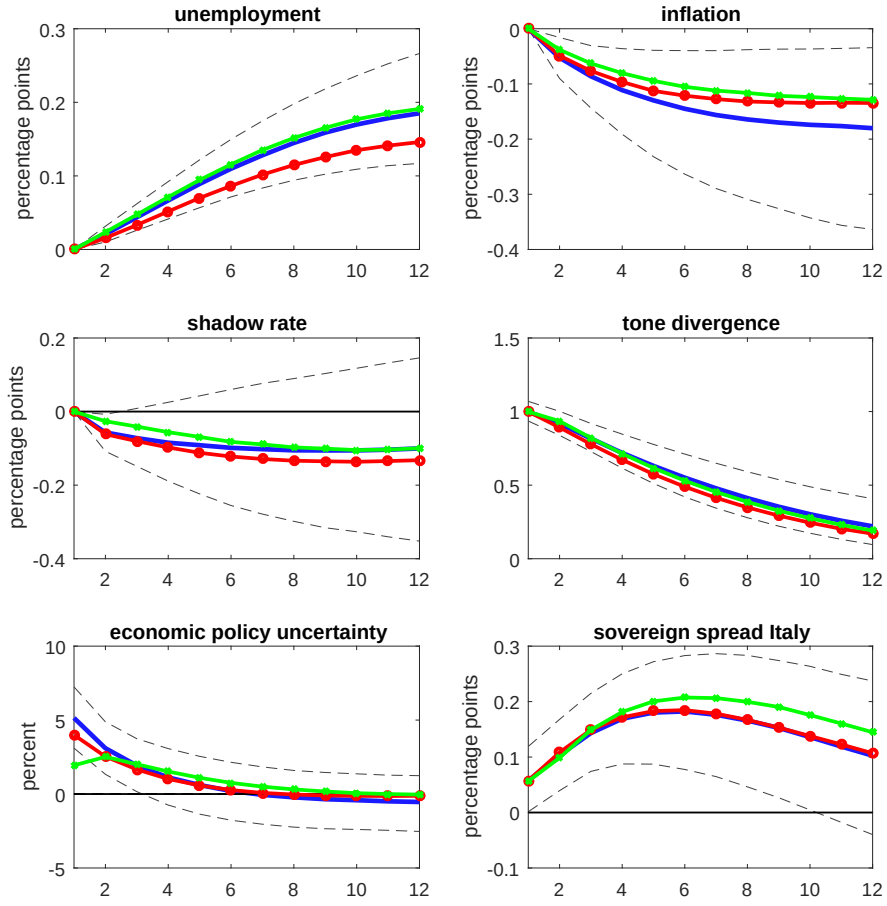
Notes: Responses to a structural divergence shock obtained from baseline VAR(2) model (blue line). The dashed lines reflect 68% confidence regions. The red line is the response if tone divergence is controlled for euro area forecast divergence. The green line is the response if tone is scaled by the total number of words.

Figure 4: Series of divergence shock



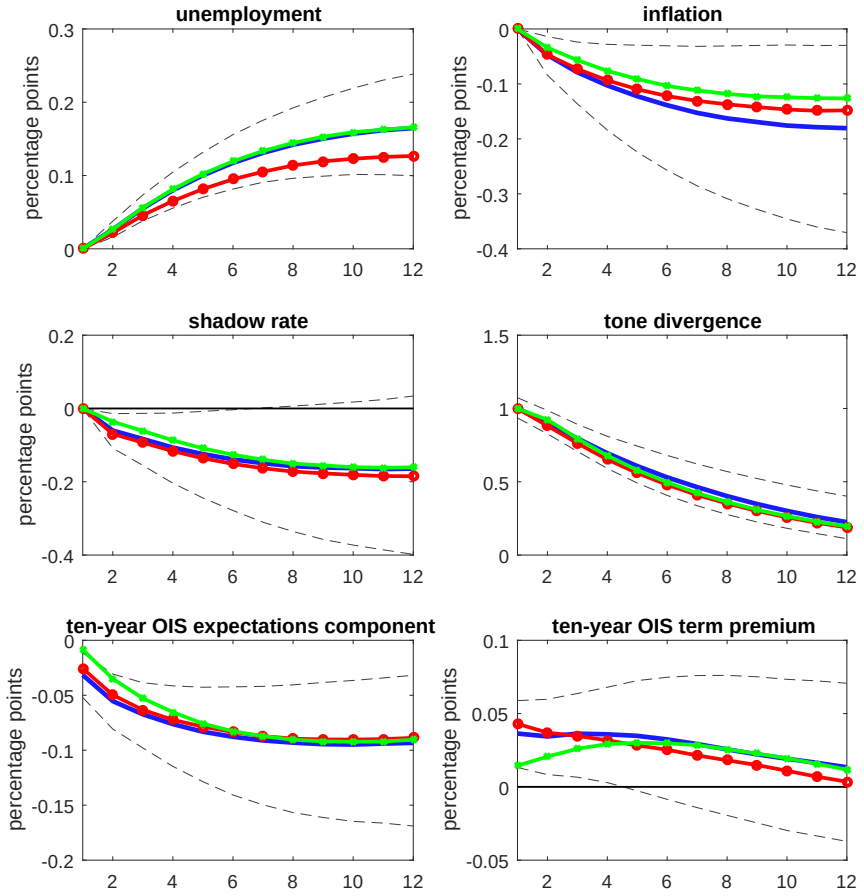
Notes: Structural divergence shock (in standard deviations) obtained from estimated VAR(2) model.

Figure 5: Responses to a divergence shock in alternative model II



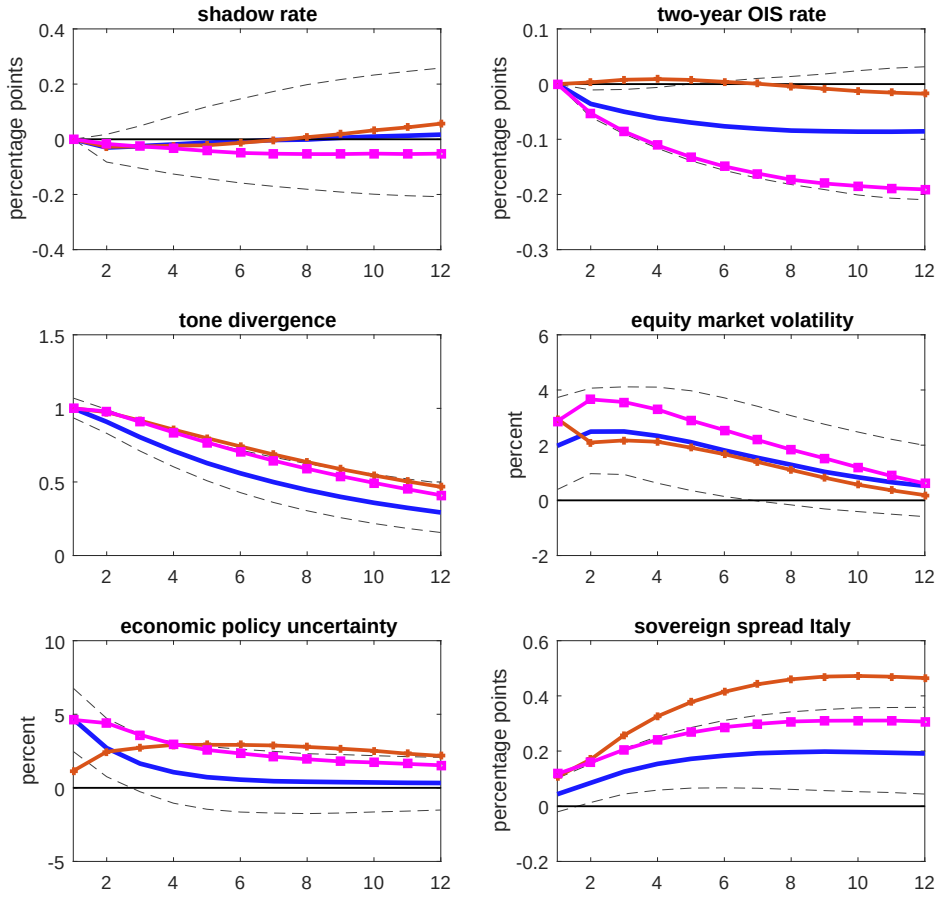
Notes: Responses to a structural divergence shock obtained from alternative VAR(2) model for $Y_t^{alt,II}$ (blue line). The dashed lines reflect 68% confidence regions. The red line is the response if tone divergence is controlled for euro area forecast divergence. The green line is the response if tone is scaled by the total number of words.

Figure 6: Responses to a divergence shock in alternative model III



Notes: Responses to a structural divergence shock obtained from alternative VAR(2) model for $Y_t^{alt,III}$ (blue line). The dashed lines reflect 68% confidence regions. The red line is the response if tone divergence is controlled for euro area forecast divergence. The green line is the response if tone is scaled by the total number of words.

Figure 7: Responses to a divergence shock in baseline model with alternative divergence measure



Notes: Responses to a structural divergence shock obtained from baseline VAR(2) model (blue line). The dashed lines reflect 68% confidence regions. The orange line is the response if tone is measured based on the negative words only. The pink line is the response if divergence is measured as the simple difference between ECB and Bundesbank tone.