Journal of Banking & Finance 37 (2013) 4278–4285

Contents lists available at ScienceDirect

Journal of Banking & Finance

journal homepage: www.elsevier.com/locate/jbf

Monetary policy transmission in vector autoregressions: A new approach using central bank communication

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ARTICLE INFO

Article history:
Received 11 July 2012
Accepted 27 July 2013
Available online 9 August 2013

JEL classification:
E52
E58

Keywords:
Central bank communication
European Central Bank
Monetary policy shocks
Monetary policy transmission
Vector autoregression

ABSTRACT

In this paper, we study the role played by central bank communication in monetary policy transmission. We employ the Swiss Economic Institute's Monetary Policy Communicator to measure the future stance of the European Central Bank's monetary policy. Our results indicate, first, that communication has an influence on inflation (expectations) similar to that of actual target rate changes. Communication also plays a noticeable role in the transmission of monetary policy to output. Consequently, future work on monetary policy transmission should incorporate both a short-term interest rate and a communication indicator. A second finding is that the monetary policy transmission mechanism changed during the financial crisis as the overall effect of monetary policy on (expected) inflation and output is weaker and of shorter duration during this period compared to the overall sample period.

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1. Introduction

Ever since Sims's seminal paper (1980), monetary policy transmission typically has been studied using a vector autoregression (VAR) approach. In general, contractive monetary policy is found to decrease output and price level, with a maximum impact occurring after a time lag of 12–24 months (see, e.g., literature surveys by Leeper et al., 1996; Christiano et al., 1999). Several indicators of monetary policy stance have been tested over the past three decades: a monetary aggregate (Sims, 1980), an indicator based on minutes from meetings of the Federal Open Market Committee (Romer and Romer, 1989), non-borrowed reserves at the central bank (Eichenbaum, 1992), a surprise measure based on Federal funds futures (Faust et al., 2004), and the short-term interest rate (Sims, 1992), which is currently the most widely accepted single indicator (Bernanke and Blinder, 1992).

Over the past 15 years, *central bank communication* has evolved as an important tool for central bankers. By providing regular information about its economic outlook and the future stance of monetary policy, a central bank can influence the interest rate expectations of forward-looking agents before the interest rate actually changes.[1] As a consequence, there are fewer *unexpected* changes in monetary policy (Blinder et al., 2008) and studying actual interest rate shocks could thus result in a less than complete picture of the monetary transmission mechanism. Specifically, VAR models that neglect the role of communication may overestimate the effect of actual interest rate changes.

To date, however, the importance of central bank communication in the context of monetary policy transmission mechanisms has not been studied empirically,[2] even though analyzing the dynamics of the short-term interest rate, output, and inflation after (gradual) changes in communication could prove insightful. This paper fills this gap in the literature and employs the Swiss Economic Institute's (KOF) Monetary Policy Communicator (MPC) as an additional variable for measuring communication about the future course of European Central Bank (ECB) monetary policy. This indica-

[1] Theoretically, central bank communication matters (i) in the absence of a stationary economy or monetary policy rule or (ii) in the presence of non-rational expectations (Blinder et al., 2008).

[2] Note that Romer and Romer (1989) use central bank communication (minutes) to identify exogenous shocks in monetary policy. However, it is not clear why central bank communication should be treated as exogenous from macroeconomic developments or the short-term interest rate (Bernanke and Mihov, 1998). Therefore, this paper treats communication via post-meeting statements as an additional endogenous variable.

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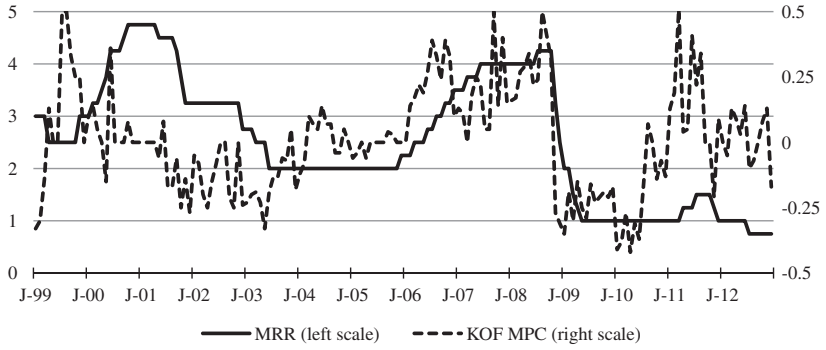
http://dx.doi.org/10.1016/j.jbankfin.2013.07.044



Source: ECB and KOF.

Fig. 1. MRR and KOF MPC. *Source*: ECB and KOF.

tor covers forward-looking information about risks to price stability as revealed in the ECB president's statement after each interest rate decision (KOF, 2007) and provides a quantitative assessment of the ECB's expected future interest rate plans. The indicator might explain transmission processes *prior to* actual interest rate movements.

Our sample period begins with the inception of the ECB in January 1999 and ends in December 2012 (168 monthly observations). Econometrically, we use VAR models to address the following research question: Does central bank communication play any role in the transmission of ECB monetary policy to inflation expectations, actual inflation, and output? Our prior is that communication fosters anticipation of future interest rate changes and is thus an important policy tool in monetary policy transmission. Since our sample covers the recent financial crisis we are also able to test whether the monetary policy transmission mechanism was different during that time span compared to the overall sample period.

The reminder of the paper is organized as follows. Section 2 introduces the dataset. Section 3 describes the econometric methodology. Section 4 discusses the empirical results. Section 5 concludes.

2. Data

We utilize two variables to measure monetary policy stance. In addition to the ECB's main refinancing rate (MRR),[3] we employ the KOF MPC. This indicator is based on a quantification of statements made by the ECB president at monthly press conferences.[4] As the ECB's primary objective is to maintain price stability over the medium term, the indicator is based on statements revealing the Governing Council's assessment of developments that directly affect future price stability. It is constructed by balancing statements implying either (i) upside risks or (ii) downside risks to price stability against all statements on the topic of future price stability (KOF, 2007).[5] Therefore, changes in this indicator can be interpreted as changes in the ECB's inflation expectations. Conrad and Lamla (2010) use the KOF MPC to show that the EUR/USD exchange rate responds to ECB communication. Sturm and de Haan (2011) find this indicator useful in predicting the ECB's next policy decision—even when the interbank rate is included in a Taylor (1993) rule model. Thus, the indicator appropriately captures ECB communication and is of relevance to financial agents.

Fig. 1 plots the MRR and the KOF MPC. Although the KOF MPC anticipates changes in the future target by two to three months (KOF, 2007), the correlation to the MRR is only 0.28 over our sample period. Communication does capture information about monetary policy beyond the MRR and, as a consequence, by including ECB communication in our model, we may gain further insight into monetary policy transmission.

3. Econometric methodology

3.1. Benchmark specification without central bank communication

Econometrically, we employ a VAR model introduced by Sims (1980). In the benchmark case without central bank communication, we estimate the five-variable model,

$$y_t = \sum_{t=1}^{k} \alpha_t y_{t-i} + \mu_t, \tag{1}$$

where y_t is a 5×1 vector of endogenous variables containing the industrial production index (IP, in logs), the harmonized index of consumer prices inflation rate, the monetary aggregate M3 (in logs), and the MRR.[6] Given the emphasis the ECB puts on expectations in the transmission of monetary policy to real macroeconomic variables, we include the 12-month-ahead expected inflation rate provided by *The Economist* poll of forecasters in addition to these standard variables.[7]

All variables enter the system as level variables (Sims and Uhlig, 1991). The number of lags is determined by a battery of lag-length selection criteria (sequential modified likelihood ratio test statistic,

[3] Note that most of the literature employs a three-month interest rate as an indicator of monetary policy stance. This choice is based on the assumption that the central bank has direct influence on interest rates beyond its target rate. However, there is sometimes a remarkable gap between the 3-Month Euro Interbank Offered Rate (Euribor) and the ECB's MRR, particularly during the recent financial crisis. Consequently, we choose the MRR as an indicator of monetary policy stance and use the 3-Month Euribor only for robustness tests. In general, use of the 3-Month Euribor supports our conclusions regarding the role of communication. The reaction of all three variables to shocks in the KOF MPC is larger compared to when the MRR is employed. All omitted results are available on request.

[4] Coding of the statements was done by Media Tenor, a media research institute (http://www.mediatenor.de).

[5] Further information on the KOF MPC can be found at: http://www.kof.ethz.ch/en/indicators/monetary-policy-communicator.

[6] Data source: ECB. As part of our robustness tests, we considered other variables in the VAR setup: EUR/USD exchange rate, euro nominal effective exchange rate, US short-term interest rate, and price indicators for commodities, housing, and oil. The results presented in Section 4 are robust to the inclusion of these variables. To optimize the degrees of freedom in our estimations, we retain the parsimonious specification. All omitted results are available on request.

[7] The ECB provides a schematic illustration of its view of monetary policy transmission at: http://www.ecb.europa.eu/mopo/intro/transmission/html/index.en.html.Note that other inflation forecasts, for instance, the ECB's staff macroeconomic projections and ECB's Survey of Professional Forecasters are available at quarterly frequency only. Monthly CPI inflation forecasts by Consensus Economics (since December 2002) are not are available for the full sample period.

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