



# International spillovers of (un)conventional monetary policy: The effect of the ECB and the US Fed on non-euro EU countries



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## ABSTRACT

We estimate a global vector autoregression model to examine the effects of euro area and US monetary policy stances, together with the effect of euro area consumer prices, on economic activity and prices in non-euro EU countries using monthly data from 2001–2016. Along with some standard macroeconomic variables, our model contains measures of the shadow monetary policy rate to address the zero lower bound and the implementation of unconventional monetary policy by the European Central Bank and the US Federal Reserve. We find that these monetary shocks have the expected qualitative effects but their magnitude differs across countries, with southeastern EU economies being less affected than their peers in Central Europe. Euro area monetary shocks have a greater effect than those that emanate from the US. We also find certain evidence that the effects of unconventional monetary policy measures are weaker than those of conventional measures. The spillovers of euro area price shocks to non-euro EU countries are limited, suggesting that the law of one price materializes slowly.

## 1. Introduction

The European Central Bank (ECB) has undertaken large-scale unconventional monetary policy measures to restore macroeconomic and financial stability in the euro area. Whereas they have been primarily intended to affect the euro area economies, given the high degree of financial and trade integration in the European Union (EU), these measures are likely to have non-negligible spillovers to non-euro EU members. Although analyses of international spillovers of monetary policy have typically focused on the US (e.g., Bauer and Neely, 2014; Chen et al., 2016; Fratzscher et al., 2017; Neely, 2015), the evidence for international spillovers of ECB monetary policy is growing (Babecka Kucharcukova et al., 2016; Hajek and Horvath, 2016; Horvath and Voslarova, 2017; Potjagailo, 2017).

Cuaresma et al. (2016) find that international monetary policy spillovers typically become more pronounced over time. Taylor (2016) emphasizes that strong monetary policy spillovers across countries may result in an accommodative monetary policy stance worldwide, thereby contributing to financial imbalances with potentially harmful real effects. For this reason, Taylor (2016) argues that sound policy rules are vital to promote stable international monetary arrangements.

Nevertheless, we still think that we can contribute to this body of literature. Including more recent data and a wider set of non-euro EU countries allows us to examine international spillovers of monetary policy in an ultra low or even negative interest rate

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environment in a more complete manner. We explicitly account for the fact that the ECB has implemented a number of unconventional measures, such as the Securities Markets Programme, Outright Monetary Transactions, and the Expanded Asset Purchase Programme; for this reason, we use shadow policy interest rates (Wu and Xia, 2016; Chen et al., 2017; Krippner, 2013). Shadow rates are designed to account for unconventional measures, are not constrained by the zero lower bound and have been argued to successfully approximate the overall monetary policy stance (Wu and Xia, 2016).<sup>1</sup>

To provide some perspective regarding the importance of euro area monetary shocks, we also examine the effect of US Fed monetary shocks (again using the aforementioned shadow policy interest rates) on non-euro EU countries. Note that many other vector autoregression studies that examine European countries do not control for the US economy. We explicitly model the EU-US interactions using a global vector autoregression model (GVAR).

Moreover, we examine not only monetary policy shocks but also international spillovers of inflation shocks. Despite the large scale of the unconventional ECB monetary policy measures that have been implemented, inflation in the euro area has remained near zero (during our sample period). An important policy question arises: to what extent are the central bankers in neighboring small open economies, such as the Czech Republic, constrained by the zero inflation environment in the euro area? In this light, we examine the international propagation (or the lack thereof) of inflationary shocks in the euro area on inflation in non-euro area countries.

Our results suggest that increasing the ECB shadow policy rate decreases economic activity and, to some extent, also prices in all countries studied. Comparing our results to those of Hajek and Horvath (2016), it seems that the international spillovers of unconventional ECB monetary policy measures are weaker than those of conventional measures, given that the present article uses the shadow policy rate (and therefore addresses both conventional and unconventional policy measures), whereas Hajek and Horvath (2016) solely focus on conventional monetary policy and find somewhat stronger international monetary spillovers.

We also find that euro area monetary shocks are more important for non-euro EU countries than monetary shocks that emanate from the US. In addition, our results demonstrate that unexpected changes in euro area consumer prices do not have a significant effect on inflationary/deflationary risks in non-euro area countries. In general, Southeastern European economies are less affected by ECB and US monetary shocks than their peers in Central Europe.

The paper is organized as follows. Section 2 discusses the related literature regarding international spillovers of monetary policy. Section 3 introduces the GVAR model, while Section 4 presents the data. We provide the results in Section 5 and conclude in Section 6. Some additional statistical tests are presented in the Appendix.

## 2. Related literature

We provide a brief review of the literature examining international macroeconomic spillovers using various types of VAR models, focusing specifically on monetary policy spillovers involving non-euro EU countries.<sup>2</sup> We refer the reader to Svensson and van Wijnbergen (1989) and Dedola et al. (2013) for the theoretical underpinnings of international monetary spillovers (for conventional and unconventional monetary policy spillovers, respectively).

Bluwstein and Canova (2016) introduce a Bayesian mixed-frequency structural vector autoregressive model and examine international spillovers of the ECB's unconventional monetary policy on several non-euro area EU countries in the period of 2008–2014. The magnitude of international spillovers into output and inflation increases with the size of the financial market and the share of domestic banks, and the spillovers are stronger in terms of output responses than in terms of inflation. Interestingly, the exchange rate regime does not matter. Bluwstein and Canova (2016) use a sum of long-term refinancing operation programs, the Securities Markets Programme, and covered bond purchase programs I and II as the measure of the ECB's unconventional monetary policy.

Babecka Kucharcukova et al. (2016) construct a monetary conditions index for the ECB policy, which is comprised of both conventional and unconventional monetary policies. Using this monetary conditions index, they examine the effects on inflation and output of several countries outside the euro area (three Central European countries and three non-euro area countries). The results suggest heterogeneity in terms of the importance of international spillovers of ECB policy. Whereas conventional policy has important spillover effects on all countries (especially for output), the international spillovers stemming from unconventional policy are typically weak, and their magnitudes vary across countries.

Horvath and Voslarova (2017) use a panel VAR model to examine spillovers of the ECB's unconventional monetary policy on economic activity and prices in the Czech Republic, Hungary and Poland. They use the shadow rates from Wu and Xia (2016) and Krippner (2013) and the Eurosystem's central bank assets as a measure of the ECB's unconventional monetary policy. Economic activity reacts more strongly than prices to the ECB's unconventional policy. Using vector decompositions, they find that the ECB's unconventional policy explains more than 10% of economic activity fluctuations but only approximately 2% of price fluctuations. The evidence that the response of output is stronger than that of prices is consistent with the convex shape of aggregate supply; therefore, monetary shocks result in output fluctuations rather than price fluctuations during recessions.

<sup>1</sup> Damjanović and Masten (2016) and Chen et al. (2017) recently adopted a shadow policy rate as an approximation of monetary policy under a zero lower bound and applied it to examine its effects on the real economy and prices. Some other studies, such as Belke and Klose (2013), propose examining the real interest rate instead of the nominal interest rate to address the issues related to the zero lower bound and the associated structural break in interest rates.

<sup>2</sup> A number of GVAR studies examine the international transmission of credit and demand shocks. See, for example, Eickmeier and Ng (2015) and Fadejeva et al. (2017). In addition, some other contributions focus on the global effects of US monetary policy; see Feldkircher and Huber (2016) and Feldkircher et al. (2017). There are also studies that apply GVAR models to the euro area. Georgiadis (2015) examines the effect of euro area monetary policy on individual euro area countries and investigates whether and why individual countries react heterogeneously to euro area monetary shocks. Belke and Osowski (2016) use a GVAR model to study fiscal spillovers in the euro area.

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