SUERF
The European Money and Finance Forum

SUERF Policy Brief
No 742, November 2023

Foreign economic policy uncertainty shocks and real activity in the Euro area*


By Filippo Arigoni (Central Bank of Ireland) and Črt Lenarčič (Banka Slovenije)

Keywords: Uncertainty shocks, Euro area spillovers, real activity, US, China, Bayesian VAR.
JEL codes: C32, E30, Q54.

In this policy brief, we document evidence of the effects of foreign economic policy uncertainty (henceforth EPU) that originates in the US and China on real activity in the Euro area. We show that US and Chinese EPU shocks trigger a contraction of Euro area real activity that lasts for one year. The empirical results also testify that external EPU accounts for larger share of real business cycle fluctuations than domestic EPU. In an extended setting, we run a counterfactual exercise to investigate the transmission channel of foreign EPU shocks on the Euro area economy. The outcomes from this simulation point to heterogeneity in the propagation mechanism of US with respect to Chinese EPU shocks.

*The views presented herein are those of the authors and do not necessarily represent the official views of the Bank of Slovenia and Central Bank of Ireland. Any remaining errors are the sole responsibility of the authors.

1. Introduction

Are foreign EPU shocks important for the real business cycle? Given the interconnectedness of countries' economies via integrated financial market, bilateral and multilateral trade activity, the answer to the question is likely to be affirmative. A recent strand of literature has shown that unexpected outcomes of policy decisions may be considered a key driver of an economic performance of a particular country. The increase of markets and countries' interdependence has generated a strong link also in the field of cross-country economic policy decisions and related disturbances. Despite the growing literature on this topic, only a few empirical applications have identified the domestic real effects of EPU shocks that originate externally (see Caggiano et al. 2020 in more detail).

To confirm this, in our paper (Arigoni and Lenarčič, 2023) we analyze the impact of US and Chinese EPU shocks on Euro area real activity in a Bayesian Vector Autoregressive framework. In order to identify EPU shocks, we exploit structural innovations in the EPU indices for US and China as was constructed by Baker et al. (2016). We also control for (either) foreign and domestic uncertainty in order to allow foreign EPU shocks to affect the domestic economy via uncertainty spillovers. Our benchmark indicator for real activity is the industrial production index (henceforth IPI), since it aggregates information from sectors that are highly tradable in nature. We also include a number of additional macro variables, including inflation, the policy rate, the bilateral real exchange rate (i.e. nominal exchange rate adjusted by the inflation rates in the two countries), and, in an extended set-up, real net exports. This allows us to focus on a measure of real activity that may plausibly be tied to external developments. The main assumption in our empirical setting is the exogeneity of the uncertainty indicators with respect to changes of the real business cycle. The assumption is supported by three important factors. First, it is consistent with the analysis of the spillover effects. Second, it reduces the distortion of the outcomes by minimizing potential second-round effects. Third, it is in line with similar specifications that Cholesky-order external uncertainty indicators before the other variables s (see Fontaine et al., 2017; Caggiano et al., 2020). Moreover, we assume that external EPU shocks have contemporaneous effects on domestic (Euro area) variables, while the external EPU proxies respond to Euro area shocks with a lag.

The results pinpoint to statistically and economically relevant effects of foreign EPU shocks for the real business cycle in the Euro area. Our findings report a deterioration of industrial production after a foreign EPU shock. The real variable fluctuations show a one-year persistence and a peak response months after US and Chinese EPU shocks. The values for the one-year ahead forecast error variance decomposition are also comparable, i.e. 15% and 10% after a US and Chinese EPU shock, respectively. In a counterfactual simulation, we show that the transmission mechanism of foreign EPU shocks onto the Euro area economy may differ conditionally on the origin of the shock.

2. Empirical setting

Before we move to the results, several aspects of the empirical setting have to be covered. As was already stressed in the Introduction section, we control for EPU by using the different EPU indices, following their development by Baker et al. (2016). The sole construction of EPU indices is based on newspaper coverage frequency. The same methodology can be applied to construct the EPU index for China and Europe. The only differences are in the choice of keywords and newspapers, since for either the Chinese and European EPU index, the authors select country/region specific words and newspapers.[1]

[1] Additional details can be found on the 'Economic Policy Uncertainty' website (Economic Policy Uncertainty Index).

Now we turn, to our empirical testing application, which relies on Vector Autoregressive (VAR) model estimated with Bayesian methods (henceforth BVAR). We estimated a model for each of the Euro area-external EPU shocks considered; hence two BVAR models are estimated. The dataset consists of six monthly variables that enter the model in the following order: the foreign (US or Chinese) EPU index, the European EPU index, the Euro area IPI change, Euro area inflation, the Euro area policy rate, and the bilateral (US dollar-EUR or CHY-EUR) real exchange rate change. The observation period of the dataset extends for roughly 20 years, depending on the model utilized (see Arigoni and Lenarčič, 2023, in more detail).

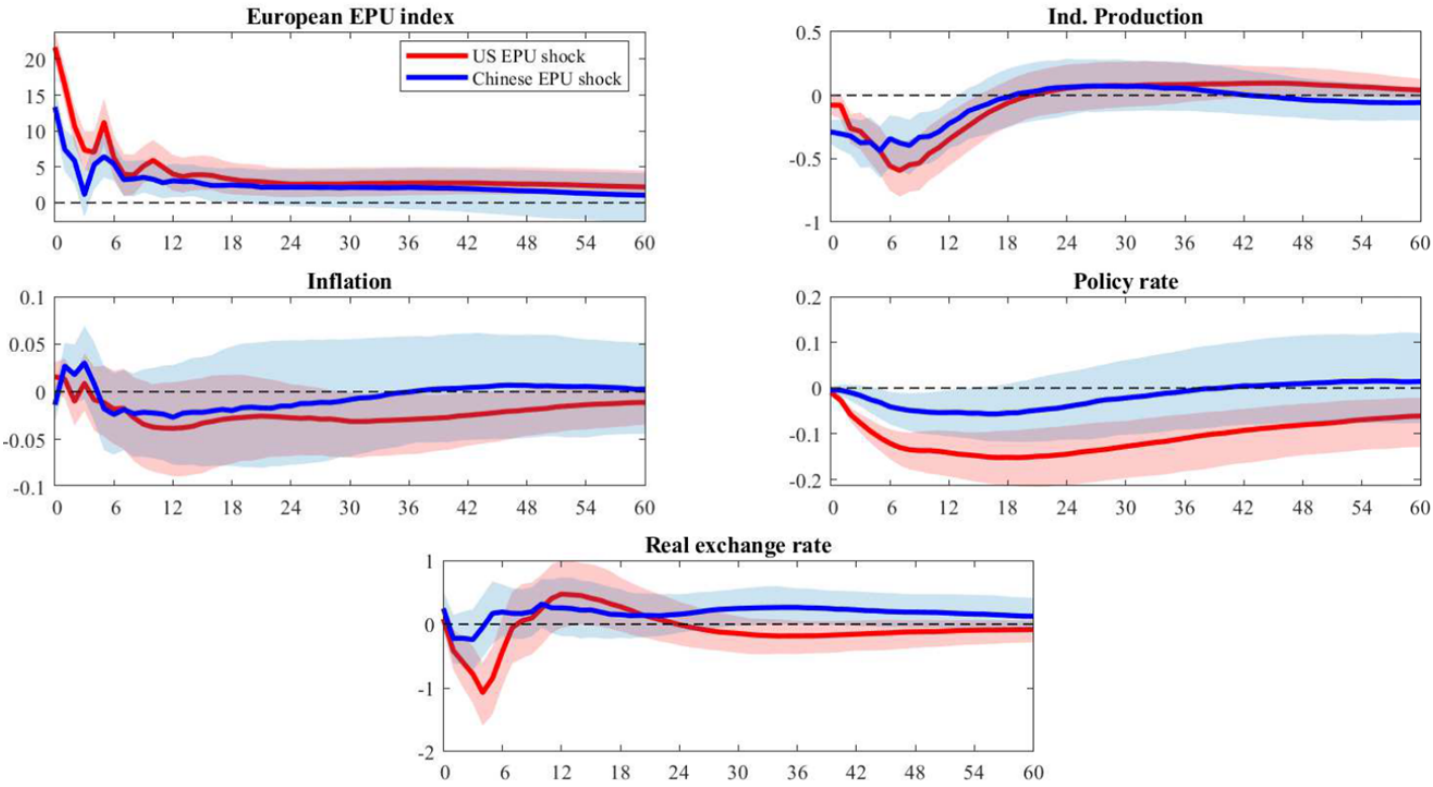
Further on, the identification is obtained recursively and the order of the variables is its key element. As already anticipated, the ordering of the indicators assumes exogeneity of EPU to business cycle deviations (Nodari, 2014; Caggiano et al., 2014; Baker et al., 2016; Leduc and Liu, 2016; Caggiano et al., 2017). We borrow the exogeneity assumption for the foreign-domestic EPU indices from Fontaine et al. (2017) and Caggiano et al. (2020). In the counterfactual model setup, the baseline specification is augmented with bilateral real net exports to control, among the others, for transmission foreign EPU shocks via the trade channel.

3. Results

In order to present the dynamic reaction of the Euro area variables to US and Chinese EPU shocks, we show the impulse-response functions. Figure 1 presents the IRFs to one-standard deviation US and Chinese EPU shock of the European EPU index and the Euro area economic indicators. We first observe a similar upward movement of the European EPU index following an exogenous jump in US and Chinese EPU. A comparable reaction is also detected with regard to the IPI growth. In particular, it temporarily contracts, with a median peak response of -0.6% and -0.4% six months after a US and Chinese EPU shock, respectively, before gradually going back to their trend after about one year time (considering the associated 68% credible set). This evidence of spillover effects are in line with Caggiano et al. (2020) and their application on the impact of US EPU shocks on the Canadian business cycle. The pattern of the real activity indicator also matches with the one documented by Bloom (2009). Bloom (2009) highlights the short to medium term peak-rebound trajectory of industrial production. Inflation and, to a greater extent, the policy rate respond to foreign EPU shocks. Nonetheless, the effects on inflation is poorly significant, especially after the US EPU shocks, and short-lived (see Castelnuovo, 2022 for an overview of the inflationary effects of uncertainty shocks), while the reaction of policy denotes a substantial reaction of monetary policy to counteract uncertainty-driven economic downturns. The depreciation of Euro vis-a-vis US dollar testifies an increase of perceived global risk that entails a flight to safety and dollar value growth.

The two foreign EPU shocks explain a significant share of the volatility of the European EPU index, despite the importance of the EPU shocks originating in the US is greater than Chinese EPU shocks. The readings for IPI growth suggest a comparable contribution of EPU shocks from the US and China (15% vs. 10%). It is also worth noting that the contribution of domestic EPU shocks is lower with respect to foreign EPU in both specifications. The US EPU shocks also contribute substantially to policy rate fluctuations (23%) while Chinese EPU shocks account only marginally (3%). The role played by foreign EPU shocks in explaining inflation and exchange rate disturbances is negligible, as testified by values equal to 2%-3% for inflation and 5% and 3% for the real exchange rate in the model with the US and Chinese EPU index, respectively (see Appendix or Arigoni and Lenarčič, 2023, in more detail).

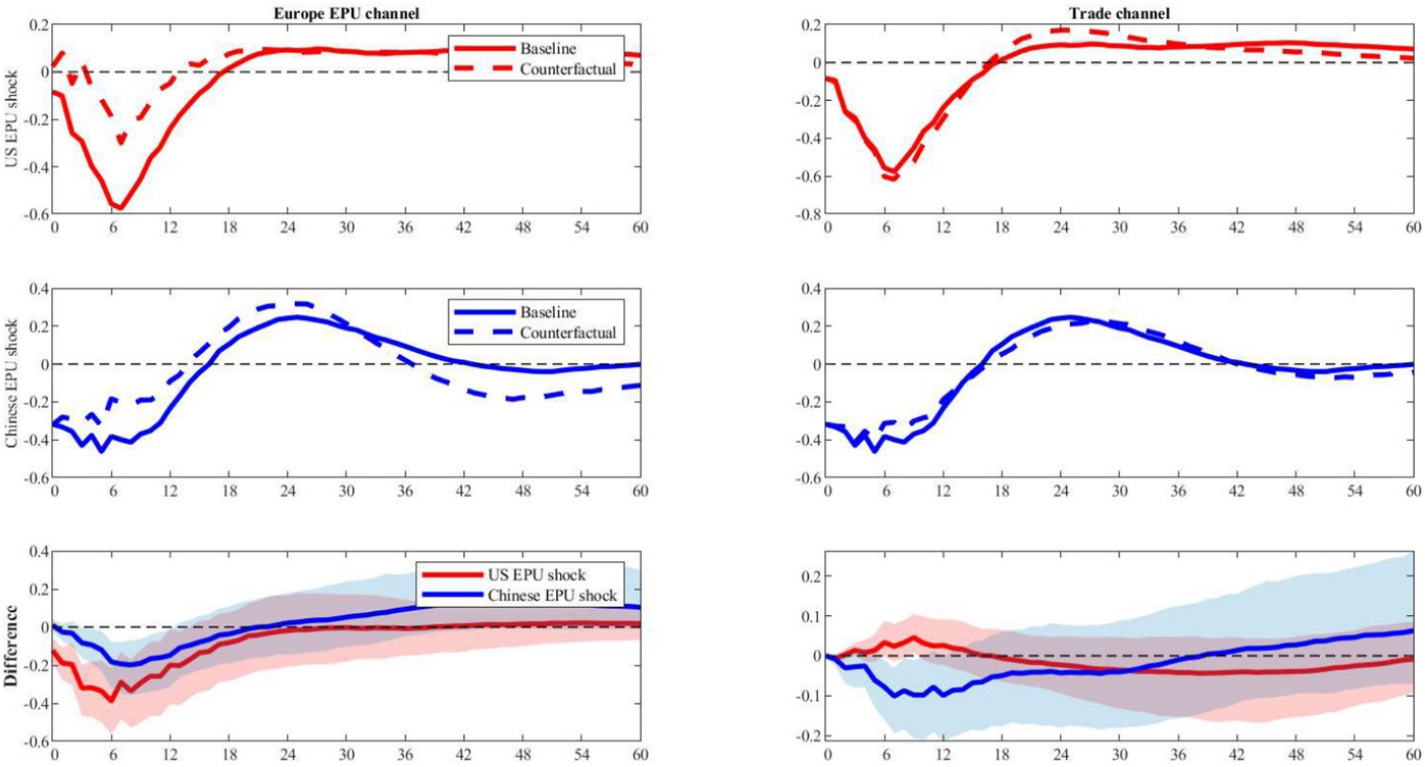
Figure 1: The impulse-response functions of the European EPU index and Euro area macroeconomic variables to a one-standard deviation foreign EPU shock.



Note: The solid line represents the posterior median at each horizon and the shaded area indicates the 68th posterior probability region of the estimated impulse responses. Number of x-axis indicates months after the shock hits.

Figure 2 plots the results from the counterfactual simulation. The results for the difference IRFs point to statistically different effects for IPI growth in the case of a European uncertainty reaction to a US EPU shock. This implies that when US EPU uncertainty spikes, the response of domestic uncertainty plays a role in the transmission of US EPU shocks to the real economy. In particular, we detect an amplification of the real effects of US EPU shocks due to US-European uncertainty spillovers. The role of domestic uncertainty is also important when a Chinese EPU shock takes place. Despite to a lower extent, movements of the European EPU index testify the presence of a Chinese-European uncertainty spillover mechanism that augments the deterioration of IPI growth. Turning to the exercise in which net exports are not allowed to react to foreign EPU shocks, we can observe different outcomes. The difference IRFs in the case of US EPU shocks are not statistically significant, while in the case of a Chinese EPU shock a small short-run reaction is retrieved. These results are confirmed by the computation of the cumulative and peak multiplier a la Caggiano et al. (2021). The computation of the multiplier allows to quantitatively compare the IRFs function across the baseline and counterfactual scenarios and support the evidence as depicted in Figure 2.

Figure 2: The impulse-response functions of the Euro area IPI growth to a one-standard deviation foreign EPU shock. The last row contains the difference between IRFs in the baseline and counterfactual scenario.



Note: The solid line represents the posterior median at each horizon and the shaded area indicates the 68th posterior probability region of the estimated impulse responses. Number of x-axis indicates months after the shock hits.

4. Conclusions

This note shows the outcomes of the Euro area data analysis based on a Bayesian VAR with the intention of exploring the contribution of EPU shocks originated in the US ad China to domestic (Euro area) real business cycle fluctuations. Our results show that foreign EPU shocks are more important than European EPU shocks in terms of the total contraction of real activity. We investigate the propagation mechanism of foreign EPU shocks onto the Euro area economy and show the existence of a domestic EPU channel through which external EPU shocks amplify. Additionally, we also document that Chinese EPU shocks propagate via a trade channel onto the real business cycle in the Euro area. Based on the results, we find that, given the high degree of trade openness of the Euro area, the trade channel plays a crucial role, especially in the propagation of Chinese EPU shocks.

Appendix

Table 1 compares the 12-month ahead FEVD for each variable of interest to different EPU shocks, while Table 2 shows the median cumulative (peak) foreign uncertainty multiplier of industrial production at a 12-month horizon.

Table 1: The median forecast error variance decomposition (FEVD) at a 12-month horizon

Variable\Shock	US EPU	Chinese EPU	EU EPU (US)	EU EPU (China)
EPU	0.41 [0.10 0.23]	0.16 [0.32 0.50]	0.45 [0.37 0.54]	0.62 [0.54 0.71]
IPI	0.15 [0.07 0.25]	0.10 [0.04 0.20]	0.07 [0.05 0.15]	0.09 [0.03 0.19]
Inflation	0.02 [0.01 0.07]	0.03 [0.01 0.06]	0.15 [0.05 0.42]	0.02 [0.01 0.06]
Policy rate	0.25 [0.13 0.34]	0.03 [0.01 0.09]	0.07 [0.02 0.14]	0.18 [0.09 0.30]
Real exchange rate	0.05 [0.03 0.10]	0.03 [0.01 0.06]	0.02 [0.01 0.06]	0.05 [0.02 0.10]

Note: The individual contributions are reported as fractions of the total forecast error variance decomposition (FEVD). Brackets contain the 68th posterior probability region of the forecast error variance decomposition distribution (FEVD). The second and third column contains the results related to US and Chinese EPU shocks while the fourth and fifth column contain the results related to European EPU shocks, so that EU EPU (US) indicates EU EPU shocks in the model with US EPU and EU EPU (China) indicates EU EPU shocks in the model with US EPU.

Table 2: The median cumulative (peak) foreign uncertainty multiplier of industrial production at a 12-month horizon

Model\Channel	EPU channel	Trade channel
US EPU	1.87 (1.75) [−3.03 (1.16) 4.76 (3.58)]	0.95 (0.96) [0.86 (0.87) 1.00 (1.02)]
Chinese EPU	1.46 (1.18) [1.06 (0.98) 2.41 (1.50)]	1.20 (1.08) [1.01 (1.00) 1.58 (1.27)]

Note: Brackets contain the 68% credible interval of the multiplier distribution.

References

Arigoni, F., and Lenarčič, Č. (2023). *Foreign economic policy uncertainty shocks and real activity in the Euro area*. Central Bank of Ireland Research Technical Paper, Vol. 2023, No. 7 (07RTP23).

Baker, S. R., Bloom, N., and Davis, S. J. (2016). Measuring economic policy uncertainty. *The Quarterly Journal of Economics, 131(4):* 1593–1636.

Bloom, N. (2009). The impact of uncertainty shocks. *Econometrica*, *77(3):* 623–685.

Caggiano, G., Castelnuovo, E., Delrio, S., and Kima, R. (2021). Financial uncertainty and real activity: The good, the bad, and the ugly. *European Economic Review*, *136*: 103750.

Caggiano, G., Castelnuovo, E., and Figueres, J. M. (2017). Economic policy uncertainty and unemployment in the United States: A nonlinear approach. *Economics Letters*, *151*: 31–34.

Caggiano, G., Castelnuovo, E., and Figueres, J. M. (2020). Economic policy uncertainty spillovers in booms and busts. *Oxford Bulletin of Economics and Statistics*, *82(1):* 125– 155.

Caggiano, G., Castelnuovo, E., and Groshenny, N. (2014). Uncertainty shocks and unemployment dynamics in us recessions. *Journal of Monetary Economics*, *67*: 78–92.

Castelnuovo, E. (2022). Uncertainty before and during Covid-19: A survey. *Journal of Economic Surveys, 37*(3): 821–864.

Fontaine, I., Didier, L., and Razafindravaosolonirina, J. (2017). Foreign policy uncertainty shocks and us macroeconomic activity: Evidence from China. *Economics Letters, 155*: 121–125.

Leduc, S. and Liu, Z. (2016). Uncertainty shocks are aggregate demand shocks. *Journal of Monetary Economics, 82*: 20–35.

Nodari, G. (2014). Financial regulation policy uncertainty and credit spreads in the US. *Journal of Macroeconomics, 41*: 122–132.

About the authors

Filippo Arigoni *is currently working as an Economist in the Macrofinancial Division of the Central Bank of Ireland. He obtained a PhD in Economics from the University of Padova (Italy). His research interests include applied macroeconomics and macroeconometrics.*

Črt Lenarčič *is a Head of Development and Implementation of Macroprudential Policy at the Banka Slovenije (Bank of Slovenia). His research focuses on economic policies and quantitative macroeconomics with a strong interest on macroprudential policy. Črt received a PhD in Economics from the School of Economics and Business, University of Ljubljana, in 2020. His articles have appeared in journals such as the Journal of Macroeconomics.*