

At the end of 2018, the US Federal Reserve embarked on a shift in its monetary policy stance, which until then had followed a progressively tightening path. This shift appeared to have a significant impact on world financial markets, in particular contributing to reversing the downward trend observed in the stock markets of the main advanced and emerging market economies in the last four months of 2018. This episode underlines the importance of analysing the effect that US monetary policy shocks can have on the macro-financial conditions of all the other economies. It is also important to understand to what extent these shocks shape monetary policy in other jurisdictions, especially through short-term interest rates or, where these are close to their effective lower bound, medium and long-term rates.

This box analyses the global macro-financial effects of US monetary policy by estimating a global vector autoregressive (GVAR) model.<sup>1</sup> With the model, which comprises a network of interdependent economies that account for more than 90% of world GDP, it is possible to analyse the spillover effects of US monetary policy, considering not only its effects in the countries at the receiving end, but also the effects of the rest of the world on the US economy (spillback effects).

In the GVAR model, the macro-financial conditions of each economy are affected by domestic and external factors. The external factors may stem from another economy, as in the case of US monetary policy, or from global variables, as in the case of oil price fluctuations. Specifically, each economy is represented by a VAR model that includes the following national quarterly macro-financial variables: GDP, inflation, short and long-term interest rates, a stock market index and an effective exchange rate. The model also captures interaction between economies, as it includes a set of external variables, calculated as weighted averages of the domestic variables of the other countries, with the weightings based on bilateral trade flows, to reflect the relative importance of the other countries for each economy. Lastly, it also includes oil prices, which are relevant both for inflation and monetary policy, as a common factor to all countries.

Once estimated, the model is used to simulate an expansionary shift in the US monetary policy stance, in the form of a cut in the US short-term interest rate of 25 bp on impact.<sup>2</sup> Chart 1 shows the responses of US variables (medians and confidence bands at 68%) and, for purposes of comparison, the responses for the rest

of the world, obtained by aggregating the individual responses of the other economies, weighted by GDP. The expansionary monetary shock has the following effects in the United States: on impact, GDP growth and inflation increase (by 0.2 pp in both cases), the dollar depreciates (by 2%) and stock market prices rise (by approximately 4%). More interesting, for the purposes of this box, are the macroeconomic and financial effects of the US monetary shock on the rest of the world. In particular, global GDP growth (excluding the United States) rises by 0.4%, that is, by even more than in the US economy itself, while stock market prices increase by 5% on impact and by up to 8% after one quarter.

This evidence confirms previous findings in the literature on the international effects of monetary shocks in the US economy.<sup>3</sup> These findings are consistent with the idea that US monetary policy shifts drive a global financial cycle, with the main implication being that monetary policy shocks in the United States trigger international synchronisation of financial asset prices and volumes.<sup>4</sup>

In order to explore whether a flexible exchange rate isolates other countries' monetary policy from the effects of US monetary policy, each economy is classified according to whether or not its currency is effectively anchored to the US dollar.<sup>5</sup> The effects at a country level are then aggregated into two groups, according to whether the exchange rate is flexible or is anchored to the dollar, weighting the different economies according to their share of the total GDP of each group. Chart 2 shows the medians of the maximum effects (minimum effects in the case of negative responses) for the two groups and the average effect at a global level. It is observed that the effects on GDP growth and stock market prices are more pronounced in the case of economies whose currencies are pegged to the dollar. At the same time, the effects on economies with flexible exchange rates are considerable, and in the case of inflation quite similar to those observed for

1 See S. Dées and A. Galesi (2019), "The Policy Trilemma and the Global Financial Cycle: Evidence from the International Transmission of Unconventional Monetary Policy", mimeo.

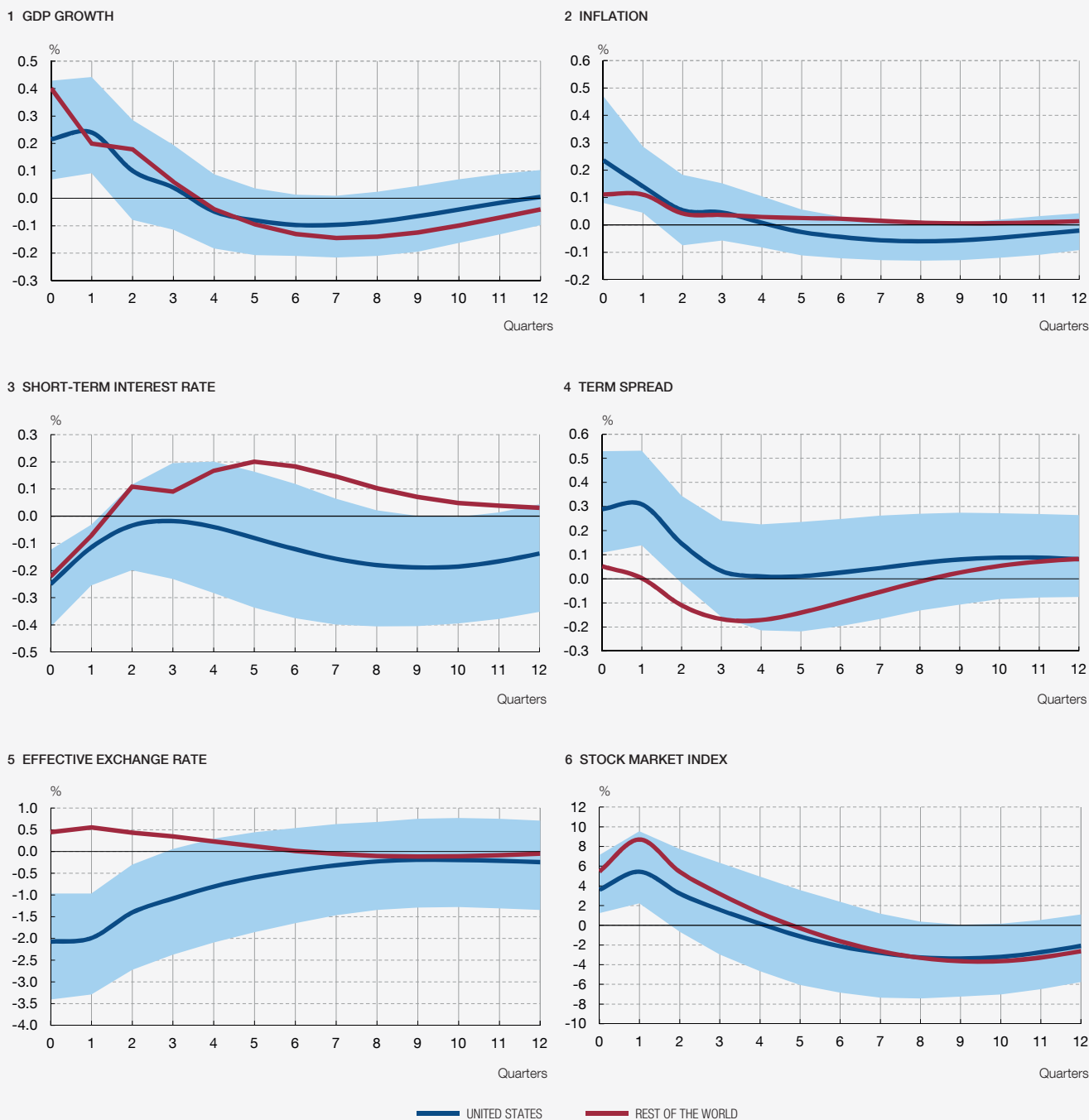
2 Identifying US monetary policy shocks consists in imposing sign constraints on the responses of US variables. An expansionary shock that reduces the short-term interest rate (and, to a lesser extent, the long-term rate) entails, both on impact and one quarter after the shock, increases in GDP growth, inflation and share prices, and also a depreciation of the dollar. As the strategy places no constraints on other countries' variables, it is completely agnostic as to the size and sign of the effects on the rest of the world.

3 Several studies have found that an expansionary shift in US monetary policy drives economic activity in many of the countries of the rest of the world. See, in particular: G. Georgiadis (2016), "Determinants of global spillovers from US monetary policy", *Journal of International Money and Finance* 67, pp. 41-61; L. Dedola, G. Rivolta and L. Stracca (2017), "If the Fed sneezes, who catches a cold?" *Journal of International Economics* 108, pp. 23-41; and M. Iacoviello and G. Navarro (2019), "Foreign effects of higher US interest rates", *Journal of International Money and Finance* 92, pp. 232-250.

4 The transmission mechanisms of the global financial cycle are several and complex, owing for instance to the presence of frictions in the credit channel, the presence of currency mismatch in commercial banks' balance sheets or the "fear of floating" of monetary authorities in economies with flexible exchange rates. See H. Rey (2016), "International channels of transmission of monetary policy and the Mundellian trilemma", *IMF Economic Review*, 64, pp. 6-35.

5 Using for this purpose the indicator developed in E. Ilzetzki, C. M. Reinhart and K. S. Rogoff (2017), "Exchange arrangements entering the 21st century: which anchor will hold?", National Bureau of Economic Research Working Paper No. 23134.

**Chart 1**  
EFFECTS OF A UNITED STATES EXPANSIONARY MONETARY POLICY SHOCK ON THE UNITED STATES AND THE REST OF THE WORLD (a)



SOURCES: K. Mohaddes and M. Raissi (2018), "Compilation, Revision and Updating of the Global VAR (GVAR) Database, 1979Q2-2016Q4", University of Cambridge, Faculty of Economics, mimeo, and OECD Main Economic Indicators. Compiled drawing on S. Déés and A. Galesi (2019), "The Policy Trilemma and the Global Financial Cycle: Evidence from the International Transmission of Unconventional Monetary Policy", mimeo.

a Impulse responses of US variables, medians and confidence bands at 68%, to a US expansionary monetary policy shock that cuts the US short-term interest rate by 25 bp on impact. For purposes of comparison, the median responses for the rest of the world are shown, obtained by aggregating the responses of the other economies weighted by GDP.

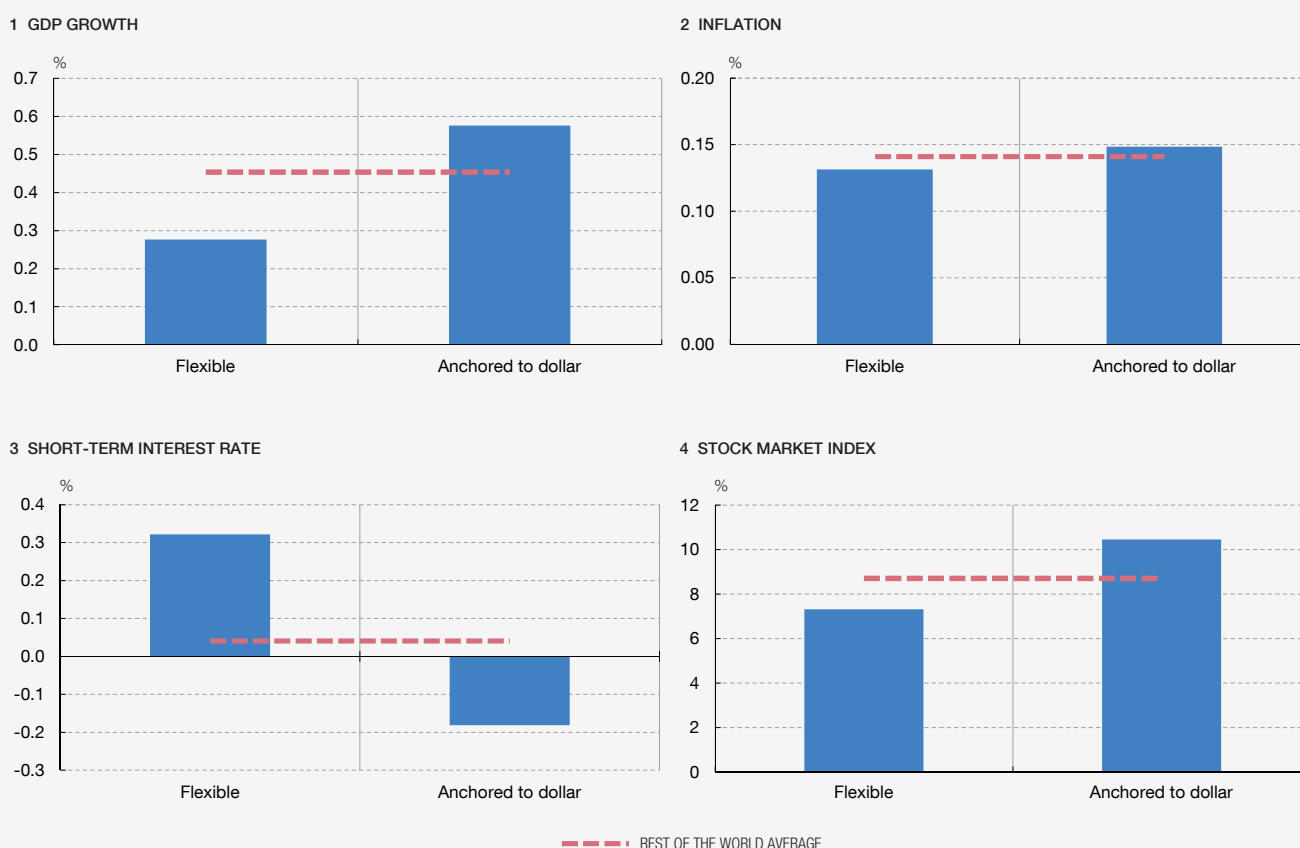
economies with exchange rates pegged to the dollar. According to the logic of the global financial cycle, beyond the commercial effects, the credit channel is key to understanding these findings: US monetary policy easing drives up prices of financial assets, which in turn improves the financial position of banks and eases their financial conditions. This improvement in financial conditions translates into increased credit, which drives up activity and prices.<sup>6</sup> The main difference between the two groups of economies

in Chart 2 is the short-term interest rate response: while central banks of countries whose currencies are pegged to the dollar cut interest rates to prevent exchange rate appreciation, monetary authorities in economies with flexible exchange rates raise interest rates to counteract the rise in inflation.

In short, the evidence presented in this box suggests that, even though the macroeconomic effects are greater in economies whose currencies are pegged to the dollar, US monetary policy has a major impact on all economies, including those that adopt a flexible exchange rate.

<sup>6</sup> See H. Rey (2016), op cit.

Chart 2  
EXCHANGE RATE REGIME AND EFFECTS OF A UNITED STATES EXPANSIONARY MONETARY POLICY SHOCK (a)



SOURCES: K. Mohaddes and M. Raissi (2018), "Compilation, Revision and Updating of the Global VAR (GVAR) Database, 1979Q2-2016Q4", University of Cambridge, Faculty of Economics, mimeo, and OECD Main Economic Indicators. Compiled drawing on S. Déés and A. Galesi (2019), "The Policy Trilemma and the Global Financial Cycle: Evidence from the International Transmission of Unconventional Monetary Policy", mimeo.

a Medians of the maximum effects (minimum effects in the case of negative responses) for both groups - flexible exchange rate and exchange rate anchored to the dollar - and average for the effect at a global level.