WIFO RESEARCH BRIEFS
1/2023

On (Current) Monetary Tightening and Inflation

Stefan Schiman-Vukan

On (Current) Monetary Tightening and Inflation

Stefan Schiman-Vukan

Austrian Institute of Economic Research

Supported by Anniversary Fund of the Oesterreichische Nationalbank

Internal review: Ewald Nowotny, Peter Mooslechner

Research assistant: Astrid Czaloun

WIFO Research Briefs 1/2023
February 2023

Abstract

In response to rising inflation, monetary policy in many countries around the world has recently been tightened, often sharply. This Research Brief shows that central banks have reacted with remarkable similarity, and that, contrary to what current policy rates might suggest, tightening in the USA and the euro area has so far been of roughly the same magnitude. It is also shown that the disinflationary effects of monetary tightening are not yet clearly evident. This is true both for the world's major currencies as well as for European currencies. The report then draws on new empirical evidence which shows that the ECB's interest rate policy from 1999 to 2019 had the desired effect on inflation, but that this effect unfolded only gradually. Thus, the price-dampening effects of the current tightening cycle have yet to materialise. The more monetary policy is tightened now, the more disinflation will be amplified as non-monetary price shocks unwind. It therefore seems appropriate to wait for the effects of the monetary policy measures taken so far before tightening further.

E-Mail: stefan.schiman-vukan@wifo.ac.at

2023/1/RB/2718

Medieninhaber (Verleger), Hersteller: Österreichisches Institut für Wirtschaftsforschung
1030 Wien, Arsenal, Objekt 20 | Tel. (43 1) 798 26 01-0 | https://www.wifo.ac.at
Verlags- und Herstellungsort: Wien

Kostenloser Download: https://www.wifo.ac.at/wwa/pubid/70619

On (current) monetary tightening and inflation

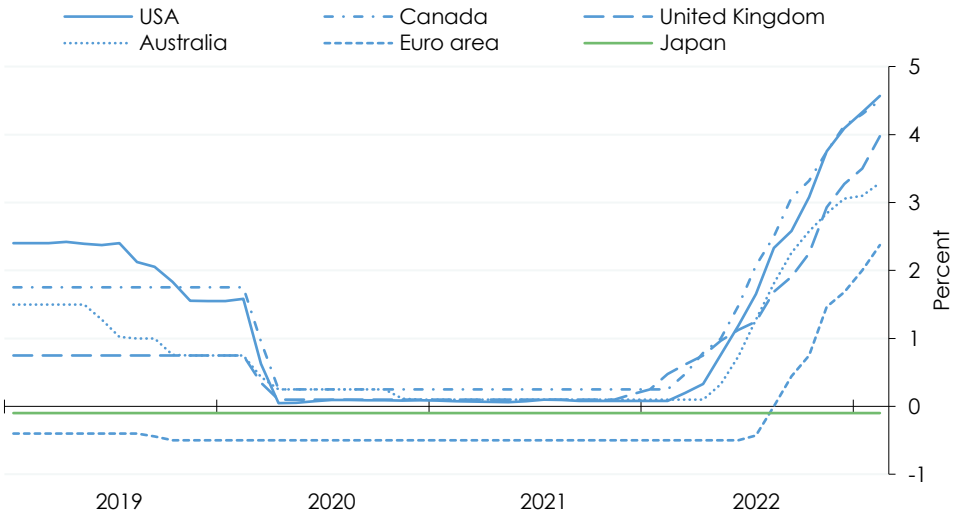
Stefan Schiman-Vukan

1. Monetary policy and inflation in major advanced economies

After more than a decade of unprecedentedly low inflation and loose monetary policy, inflation has risen dramatically over the past two years and monetary policy has been tightened sharply in most countries of the world. Figure 1 shows the development of key interest rates for the currencies of the major advanced economies – the US dollar, Canadian dollar, Australian dollar, pound sterling, euro, and yen – over the past four years. Japan stands out; unlike the other currencies, the yen continues to be subject to a zero interest rate policy. But even among the other currencies, there are more subtle differences that need to be taken into account when making international comparisons. These differences relate to

- the point in time at which the current tightening cycle has started,
- the level of policy rates at the start of the tightening cycle,
- the level of policy rates prior to the outbreak of the COVID-19 crisis.

Figure 1: **Policy rates in major advanced economies**

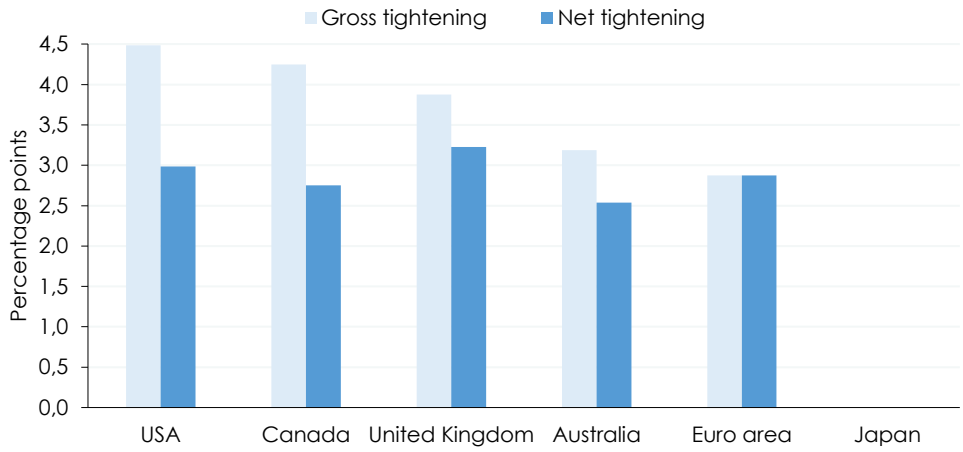


Source: Bank of Canada (overnight target rate), Bank of England (bank rate), Bank of Japan (policy rate), European Central Bank (deposit facility rate, cf. footnote 1), Federal Reserve Bank (effective federal funds rate), Reserve Bank of Australia (cash rate), Macrobond. – All rates are at monthly averages. February 2023 values are expected values.

1.1 Measuring the monetary policy stance

Among the countries and currency areas considered in Figure 1, policy rates were raised first in the United Kingdom (December 2021) and last in the euro area (July 2022). The policy rate before tightening was 0.1 percent in the USA, the United Kingdom and Australia, 0.25 percent in Canada, and −0.5 percent in the euro area[1]. To take account of these differences in the international comparison of monetary policy, one could use the cumulative increase in policy rates since the start of tightening. Accordingly, the policy rate so far has risen the least in the euro area (by 2.9 percentage points) and the most in the USA (by 4.5 percentage points).

Figure 2: **Gross and net tightening**



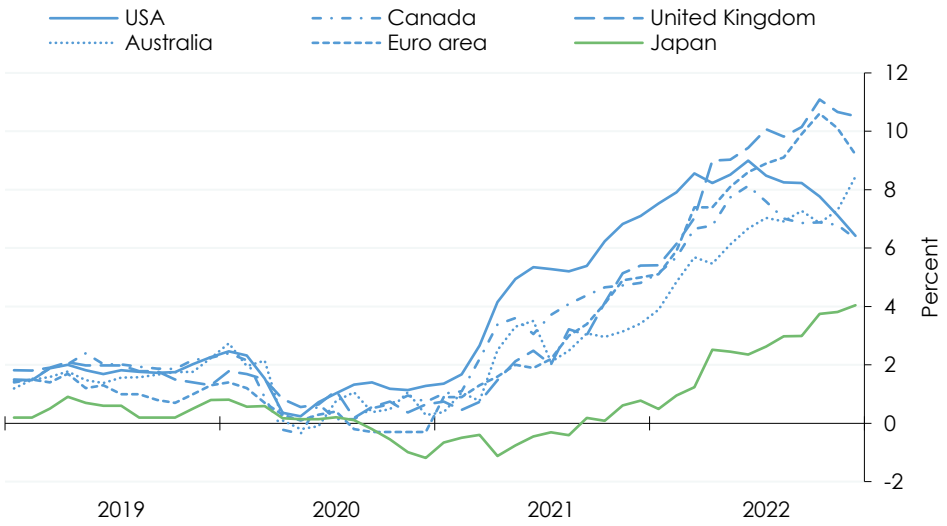
Source: WIFO calculations. – Gross tightening refers to the change in policy rates in percentage points since the start of the tightening cycle until February 2023 (expected values). Net tightening refers to the change in policy rates in percentage points since February 2020.

This measure, however, also falls short of a comprehensive assessment of the monetary policy stance, as similar policy rates before the start of the tightening cycle may have represented different intensities of monetary easing. To get a complete picture, we need to consider the level of key interest rates before the outbreak of the COVID-19 crisis. This reveals significant differences. In the USA, the effective federal funds rate was around 1.6 percent in February 2020, while the ECB's deposit facility rate was already −0.5 percent. The Federal Reserve used this room for manoeuvre to react (allegedly) counter-cyclically when the COVID-19 crisis hit and cut interest rates. The ECB no longer had this option, because the euro was apparently already at the lower bound and interest rates could not be lowered any further, or no economic stimulus could be expected from a further reduction.[2]

[1] With the switch from variable rate tenders to fixed rate tenders with full allotment in October 2008 and the associated build-up of excess liquidity in the banking system, the deposit facility rate took over the role of the key interest rate from the main refinancing rate (Hartmann & Smets, 2018).

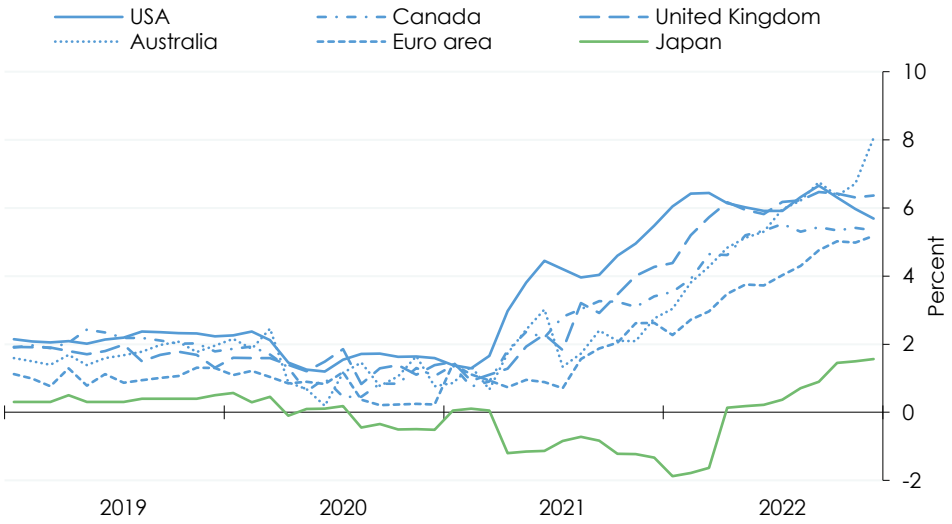
[2] The ECB launched the Pandemic Emergency Purchase Program in order to ensure the transmission of monetary policy and to further ease its monetary policy stance.

Figure 3: **Headline inflation rates in major advanced economies**



Source: Australian Bureau of Statistics, Eurostat, Japanese Statistics Bureau, Statistics Canada, U. K. Office for National Statistics, U. S. Bureau of Labor Statistics, Macrobond.

Figure 4: **Core inflation rates in major advanced economies**



Source: Australian Bureau of Statistics, Eurostat, Japanese Statistics Bureau, Statistics Canada, U. K. Office for National Statistics, U. S. Bureau of Labor Statistics, Macrobond. – Core inflation, where available, is defined as headline inflation excluding energy, food, alcohol and tobacco. For Canada, Japan and the USA, it is the all-items index excluding energy and food; for Australia, it excludes volatile items.

The reason why expansionary monetary policy was "allegedly" counter-cyclical was that, unlike in typical economic downturns, the output slump caused by COVID-19 could not be substantially mitigated by counter-cyclical economic policy without contradicting the primary health policy objective of physical segregation. Rather, fiscal support and monetary easing helped to amplify the subsequent economic recovery in a procyclical and price-driving manner.

Considering the COVID-19 crisis as an atypical "production pause", it therefore seems more appropriate to compare current policy rates with those before the outbreak of the COVID-19 crisis in February 2020 and thus to measure the "net tightening" since then (i.e., net of the COVID-19-related easing).

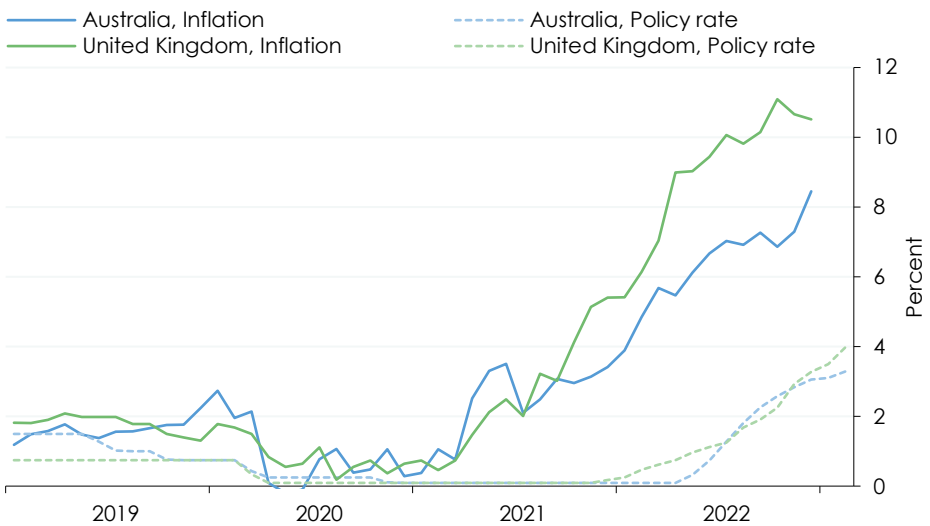
This net increase in policy rates since February 2020 ranges from 2.5 (Australia) to 3.2 (United Kingdom) percentage points for the countries and currency areas considered (excluding Japan, Figure 2). In contrast to gross tightening, net tightening in the euro area and the USA has, hence, so far been of the same magnitude (around 3.0 percentage points by February 2023).

1.2 Some tentative observations on cause and effect

The cross-country analysis of inflation and interest rate developments shows an astonishing similarity of central banks response to the inflation shock. On the contrary, the effect from tighter monetary policy on inflation is much less clearcut up to now.

For example, the acceleration of inflation in the euro area started somewhat later than in North America (see Figure 3) and was more strongly influenced by exogenous energy price shocks than by endogenous cyclical factors (see the development of core inflation in Figure 4), with the result that the ECB reacted later and more cautiously. Even Japan's monetary policy is in line with that of the other central banks: When inflation exceeded 4 percent for the first time, as it did in Japan in December 2022, it took other countries between two (United Kingdom) and eleven (USA) months to raise policy rates.

Figure 5: **Australia and United Kingdom**



Source: Australian Bureau of Statistics, Bank of England, Reserve Bank of Australia, U. K. Office for National Statistics, Macrobond. – February 2023 values are expected values.

In contrast to the homogenous central banks' response to inflation, the reverse effect, i.e., of tighter monetary policy on inflation, is not yet evident. The United Kingdom has so far recorded the largest net increase in the policy rate and has thus tightened monetary policy the most in

a pre-crisis comparison, but at the same time it had the highest inflation rate in December 2022. The Bank of England started raising interest rates earlier than North American central banks, while the latter tightened more quickly afterwards. But even this more cautious approach by the Bank of England cannot explain the stronger acceleration of inflation in the United Kingdom, as the comparison with Australia shows (Figure 5). The interest rate trajectories of these two countries are quite similar, both in terms of the starting position before the COVID-19 crisis and the degree of tightening since then. However, inflation in the United Kingdom has recently remained 2 percentage points higher than in Australia.

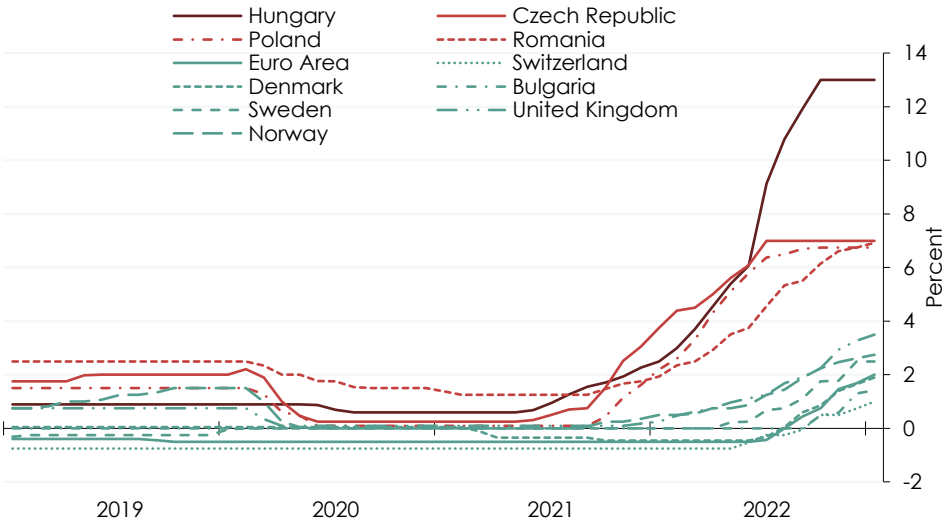
2. Monetary policy and inflation in Europe

The previous findings on monetary policy and inflation developments in the world's few major advanced economies are confirmed by an analysis of a larger sample of European countries:

1. The more inflation accelerated, the stronger the monetary policy response.
2. The effects of tighter monetary policy on inflation have not yet become apparent.

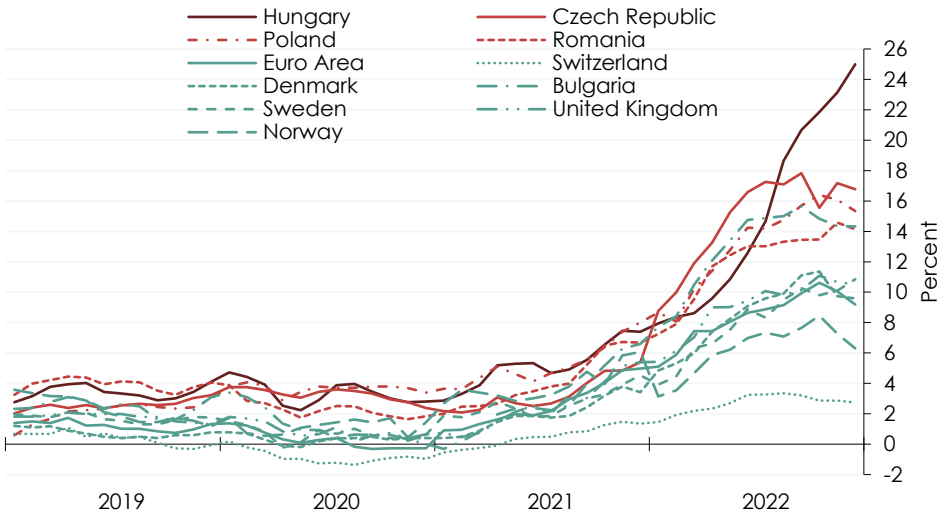
Figure 6 and Figure 7 show the development of policy rates and inflation for the euro and neighbouring currencies. Those countries whose central banks have raised interest rates very sharply (marked in red) have higher inflation rates. This positive correlation is even clearer in the scatter plot of Figure 8, which compares the change in the policy rate since the start of the respective tightening cycle (gross tightening) with the increase in inflation over the same period. These periods vary, ranging from three months (Bulgaria) to 19 months (Hungary and Czechia).

Figure 6: **Policy rates across Europe**



Source: Bank of England (bank rate), Bank of Norway (sight deposit rate), Central Bank of Denmark (lending rate), Central Bank of Hungary (base rate), Central Bank of Sweden (policy rate), European Central Bank (deposit facility rate, cf. footnote 1), National Bank of Bulgaria (base rate), National Bank of Poland (reference rate), National Bank of Romania (monetary policy rate), National Bank of Switzerland (policy rate), National Bank of the Czech Republic (two-week repo rate), Macrobond. – All rates are at monthly averages.

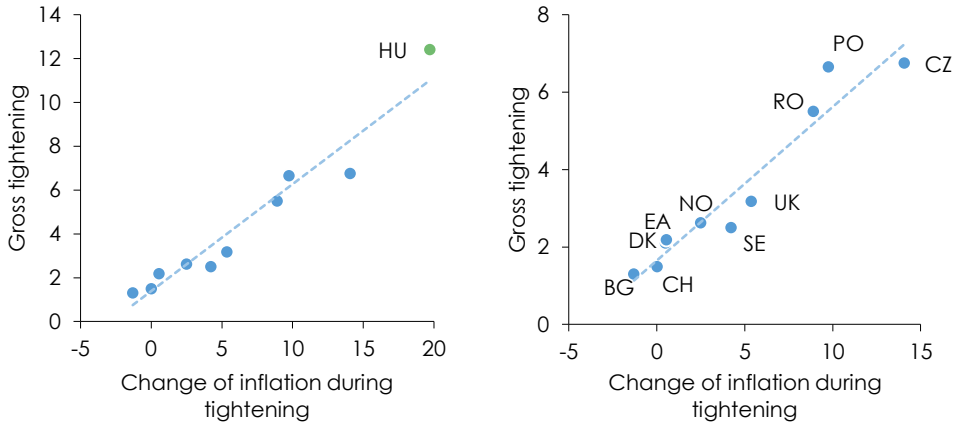
Figure 7: **Headline inflation rates across Europe**



Source: Eurostat, U. K. Office for National Statistics, Macrobond.

Figure 8: **Inflation and tightening**

Percentage points

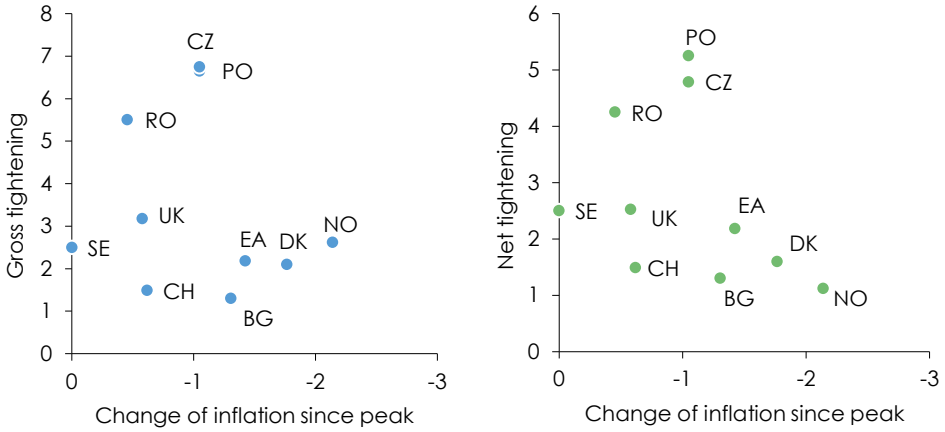


Source: WIFO calculations. – Correlation between the rise in inflation and the amount of gross tightening (left graph including Hungary, right graph excluding Hungary) until the end of 2022. – BG … Bulgaria, CH … Switzerland, CZ … Czech Republic, DK … Denmark, EA … Euro area, HU … Hungary, NO … Norway, PO … Poland, RO … Romania, SE … Sweden, UK … United Kingdom.

For example, after seven months in which Switzerland raised its policy rate by a total of 1.5 percentage points, inflation in December 2022 was roughly the same as before, whereas in the 19 months in which the Czech and Hungarian central banks raised their key rates by 6.75 and 12.4 percentage points, respectively, inflation rose by 14.1 and 19.7 percentage points. Here, even more than in the case of the world's largest advanced economies, it is evident that the development of interest rates and inflation up to the end of 2022 was determined by the impact of the latter on the former, i.e., on monetary policy. The reverse effect, i.e., a dampe-

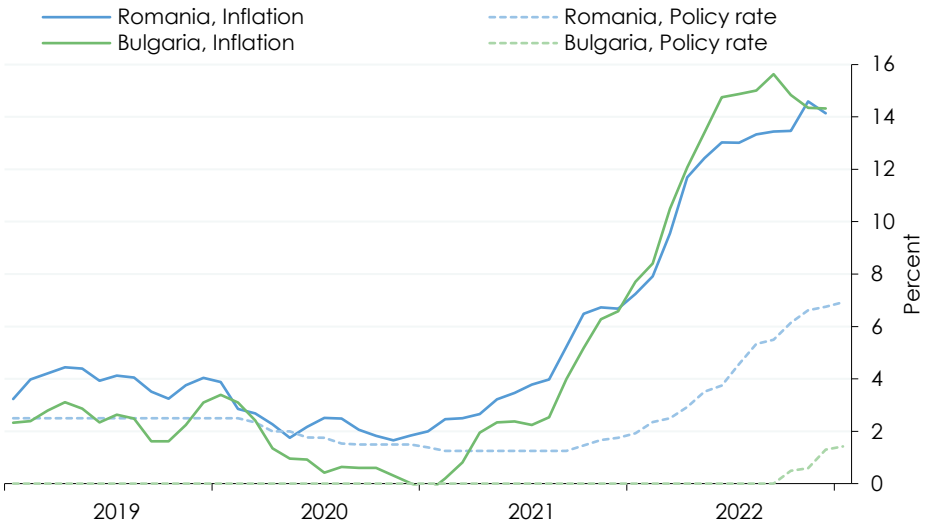
ning effect of higher interest rates on inflation, is not discernible at present. The scatter plot in Figure 9 shows that there is no systematic relationship between the rise in interest rates (net or gross) and the fall in inflation from the respective peaks.

Figure 9: **Disinflation and tightening**
Percentage points



Source: WIFO calculations. – (Missing) Correlation between disinflation and the amount of gross (left) and net (right) tightening until the end of 2022 (without Hungary as an outlier). – BG … Bulgaria, CH … Switzerland, CZ … Czech Republic, DK … Denmark, EA … Euro area, HU … Hungary, NO … Norway, PO … Poland, RO … Romania, SE … Sweden, UK … United Kingdom.

Figure 10: **Bulgaria and Romania**



Source: Eurostat, National Bank of Bulgaria, National Bank of Romania, Macrobond.

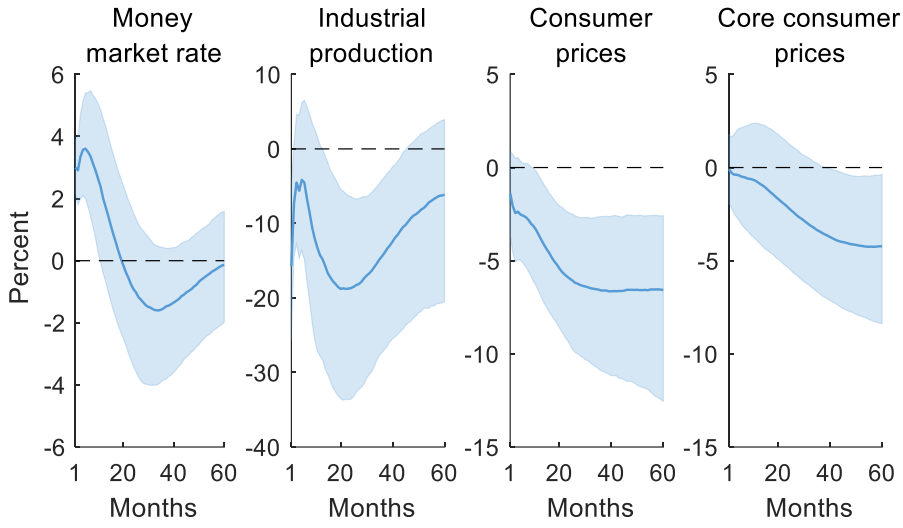
Figure 7 shows that the inflation trend in countries with less pronounced interest rate increases ("green group") is on average lower than in countries with more pronounced interest rate

increases ("red group"). The only special case seems to be Bulgaria. As a member of the European Exchange Rate Mechanism (EERM), Bulgaria has fixed its currency's exchange rate against the euro and is therefore closely tied to the ECB's monetary policy. A comparison of Bulgaria with Romania, which is comparable in economic terms but not yet a member of the EERM, confirms that the tightening of monetary policy has so far had hardly any impact on inflation: As Figure 10 shows, the more pronounced interest rate hikes in Romania have not led to a significantly lower increase in inflation than in Bulgaria, where interest rates are low.

3. The effects of monetary policy in the euro area

The descriptive analysis so far suggests that the price-dampening effects of the prevailing widespread monetary tightening are only just beginning to materialise. However, a descriptive analysis cannot provide a conclusive assessment because the counterfactual scenario – "What if monetary policy had responded differently?" – is simply not known. In the second half of 2022, inflation has fallen by 2.6 percentage points in the USA, and by 1.8 percentage points in Canada. As inflation in North America is less affected by exogenous energy price shocks than in Europe and interest rate hikes have started earlier there, these downward trends in inflation could be the first effects of monetary tightening. It is also conceivable that inflation in the euro area would be even higher if the ECB had raised interest rates by less.

Figure 11: **Impulse responses to a 300 basis points interest rate hike**



Source: Badinger & Schiman (2023). – Blue lines are median impulse responses; blue shaded areas correspond to 68% credible sets.

In order to estimate the macroeconomic effects of monetary policy, it is necessary to separate monetary policy shocks (central bank measures that cannot be explained by macroeconomic developments in terms of timing or intensity) from predictable endogenous policy responses. There are many studies on this topic, the analysis is mainly carried out using vector auto-

regressive models.[3] Here, we refer to the results of a recent paper on the impact of the ECB's conventional monetary policy (interest rate policy) during the first twenty years of its existence, i.e., from 1999 to 2019 (Badinger & Schiman, 2023).

The paper, published in the renowned "American Economic Journal: Macroeconomics", shows that the ECB's interest rate policy has the desired effect on inflation in the euro area, but that this effect unfolds only gradually.[4] As Figure 11 shows, a 300 basis point increase in the policy rate dampens consumer prices by an average of 2½ percent after six months (68 percent confidence interval: 0 to 5 percent), 4 percent after one year (1 to 7 percent) and 5½ percent after two years (2 to 9 percent). Core consumer prices react even more sluggishly, and their response is more protracted. While it takes two years for them to fall as much as the all-items index after six months, the full effect is not felt until about four years after the shock (while the all-items CPI reaches it after 2½ years).

Thus, we can expect to see significant price-dampening effects several months and even years after the monetary policy measure. These effects will be accompanied by a drag on economic activity. Industrial production is dampened for up to four years after the shock before it eventually recovers to the level it would have reached in the absence of monetary policy measures. While the range of possible quantitative effects of monetary tightening is wide, the results nevertheless allow the following clear conclusions:

1. Monetary policy has the desired effect (tightening dampens inflation).
2. The effect is not immediate but extends over a longer period of up to four years.

The considerable confidence bands are not least due to the fact that the above results represent averages over a period of 20 years and may vary over the business cycle. For example, it has been shown that restrictive monetary policy during periods of high economic growth is more effective than expansionary monetary policy during economic downturns (Tenreyro & Thwaites, 2016). The current tightening cycle should therefore have a substantial impact. However, it is also conceivable that the very strong upswing, which is accompanied by an extremely tight labour market, is particularly resilient to restrictive monetary policy measures.

Another parameter for the effectiveness of monetary policy is wage setting. Depending on whether monetary policy measures are taken into account in wage negotiations, they have stronger (weaker) real and weaker (stronger) price effects (Olivei & Tenreyro, 2007). In the current situation, however, wages are responding mainly to the rise in inflation driven by non-monetary factors (energy price shocks, economic upswing). The magnitude of these shocks could make it more difficult for monetary policy to dampen prices. A similarly massive monetary policy response is risky, as the price dampening effects could amplify a sharp decline in inflation resulting from the unwinding of non-monetary shocks.

[3] See Ramey (2016) for an overview.

[4] These qualitative findings have already been reported by many scholars, both in earlier studies (see, for example, the comprehensive work by Christiano et al. (1999) on monetary policy in the United States) and in more recent work on monetary policy in the euro area (Hafemann & Tillmann, 2020; Jarocinski & Karadi, 2020).

Another factor is the global simultaneity of monetary tightening. With the exception of China, monetary policy is currently being tightened in all major economies around the world. This is likely to amplify the output- and price-dampening effects of each country's own monetary policy through the world economy and the global financial cycle (Miranda-Agrippino & Rey, 2020).

4. Conclusions

In response to the sharp rise in inflation, monetary policy has been tightened significantly and with surprising similarity around the world as of recently. In North America, inflation has been falling for several months, and in the euro area it has probably peaked. It is difficult to say how much of this turnaround is already the result of tighter monetary policy and how much is due to the unwinding of non-monetary price shocks. In any case, the recent interest rate hikes will have a significant macroeconomic impact over several months and even years. In a worst-case scenario, this could exacerbate any disinflation resulting from the fading out of the current energy price shocks or from the economy itself eventually being weakened by these supply shocks. In other words, the more ambitiously monetary policy is tightened now, the greater the monetary easing that could be required later if disinflation is high. This would increase the volatility and narrow the room for manoeuvre of monetary policy. It therefore seems preferable to flatten the tightening cycle for the time being. If the economy proves to be resilient this year, or if the compensation for real wage losses achieved in wage negotiations hampers disinflation, tightening could be accelerated again in 2024.

Literature

Badinger, H., & Schiman, S. (2023). Measuring monetary policy in the euro area using SVARs with residual restrictions. *American Economic Journal: Macroeconomics*, 15(2), 1-28.

Christiano, L. J., Eichenbaum, M., & Evans, C. L. (1999). Monetary policy shocks: What have we learned and to what end? In Taylor, J. B. & Uhlig, H. (editors), *Handbook of Macroeconomics* (vol. 1, p. 65−148). Elsevier.

Hafemann, L., & Tillmann, P. (2020). The aggregate and country-specific effectiveness of ECB policy: Evidence from an external instruments VAR approach. *International Journal of Central Banking*, 16(6), 97-136.

Hartmann, P., & Smets, F. (2018). The European Central Bank's monetary policy during its first 20 years. *Brooking Papers on Economic Activity*, Fall 2018, 1-118.

Jarocinski, M., & Karadi, P. (2020). Deconstructing monetary policy surprises – The role of information shocks. *American Economic Journal: Macroeconomics*, 12(2), 1-43.

Miranda-Agrippino, S., & Rey, H. (2020). U.S. monetary policy and the global financial cycle. *Review of Economic Studies*, 87(6), 2754-2776.

Olivei, G. & Tenreyro, S. (2007). The timing of monetary policy shocks. *American Economic Review*, 97(3), 636-663.

Ramey, V. A. (2016). Macroeconomic shocks and their propagation. In Taylor, J. B. & Uhlig, H. (editors), *Handbook of Macroeconomics* (vol. 2, p. 71-162). Elsevier.

Tenreyro, S. & Thwaites, G. (2016). Pushing on a string: US monetary policy is less powerful in recessions. *American Economic Journal: Macroeconomics*, 8(4), 43-74.