R(ising) star?

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Real risk-free interest rates declined across advanced economies

## Real short-term interest rates across advanced economies
(percent)
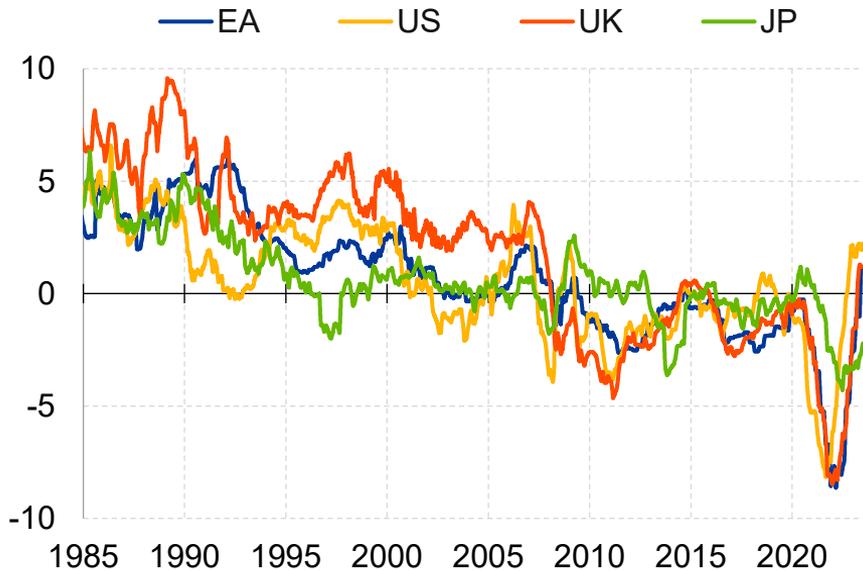
Sources: Bloomberg, FRED, ECB calculations.
Notes: 20-day rolling window. Euro area overnight rate is deflated by German CPI before March 1991 while overnight rate is proxied by German overnight rate before January 1991 and EONIA – 8.5 bps before €STR was introduced in October 2019. UK and JP overnight rates are proxied by OECD interbank rates before introduction of SONIA and TONAR on January 1997 and October 1992, respectively.
Last observation: 13 March 2024.

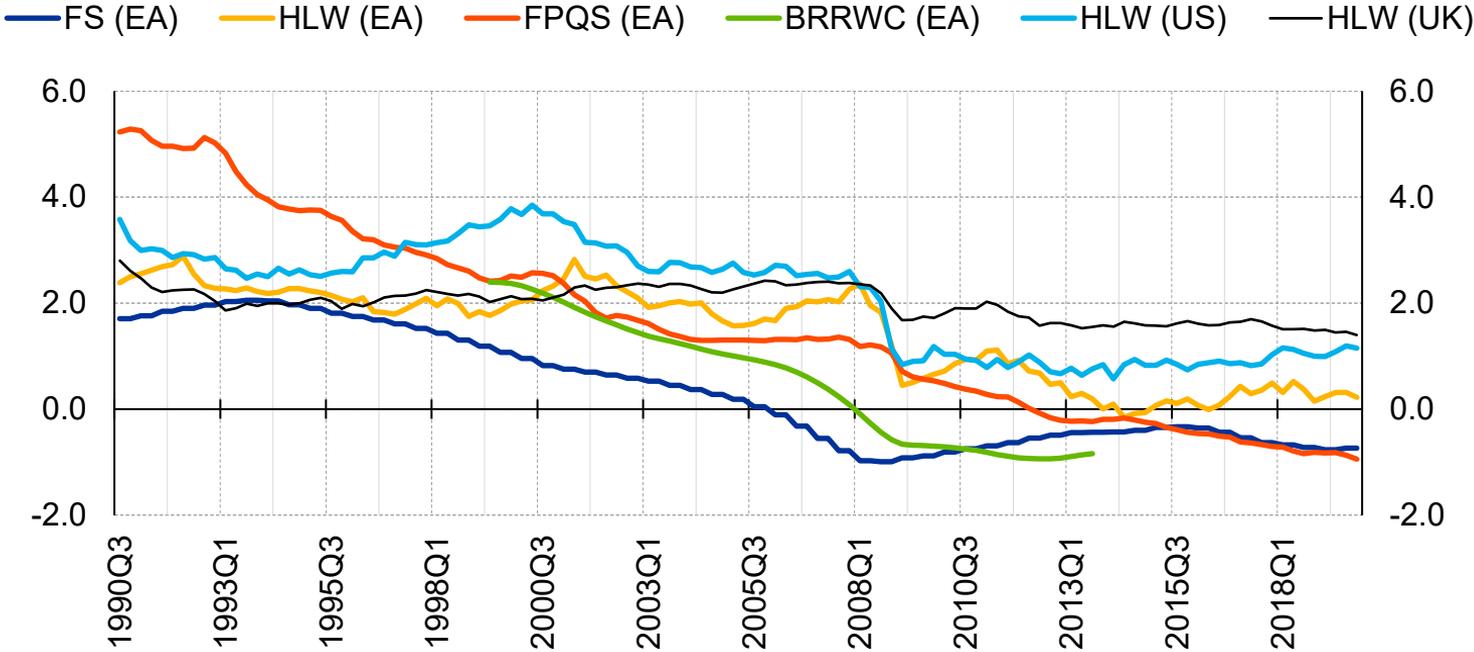## Real long-term interest rates across advanced economies
(percent)
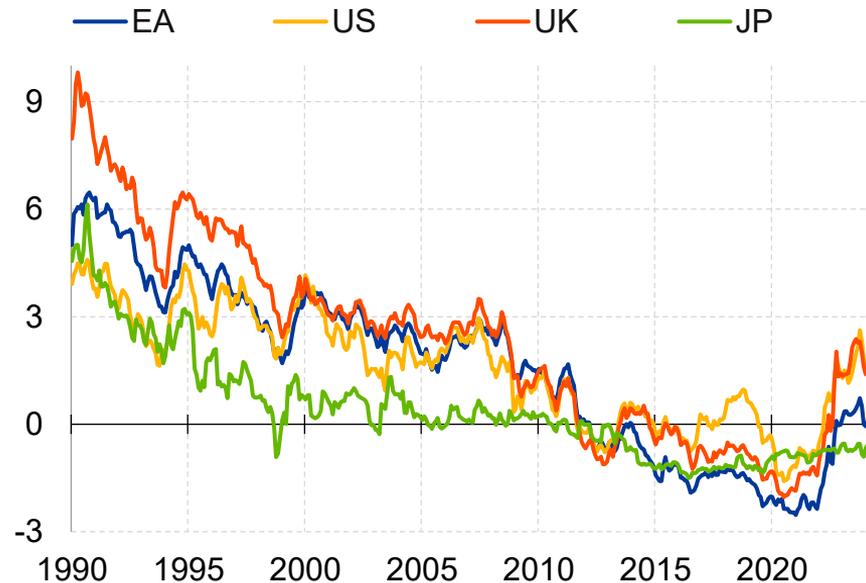
Sources: FRED, Consensus Economics, Bloomberg, ECB calculations.
Notes: Real yields are proxied by subtracting long-term inflation expectations from nominal yields. Euro area real yields are proxied by Germany.
Last observation: 1 March 2024.

2

Model-based estimates of r*
(percent)



Sources: Measures of r* for the euro area estimated by Ferreira and Shousha (2023, FS), Holston et al. (2023, HLW), Fiorentini et al. (2018, FPQ), Bouis et al. (2013, BRRWC) and Haavio et al. (2018, HJM). Measures of r* for the US and UK estimated by Holston et al. (2023, HLW).
Last observation: Q4 2019.

Long-run DFR expectations from SMA
(percentage per annum)
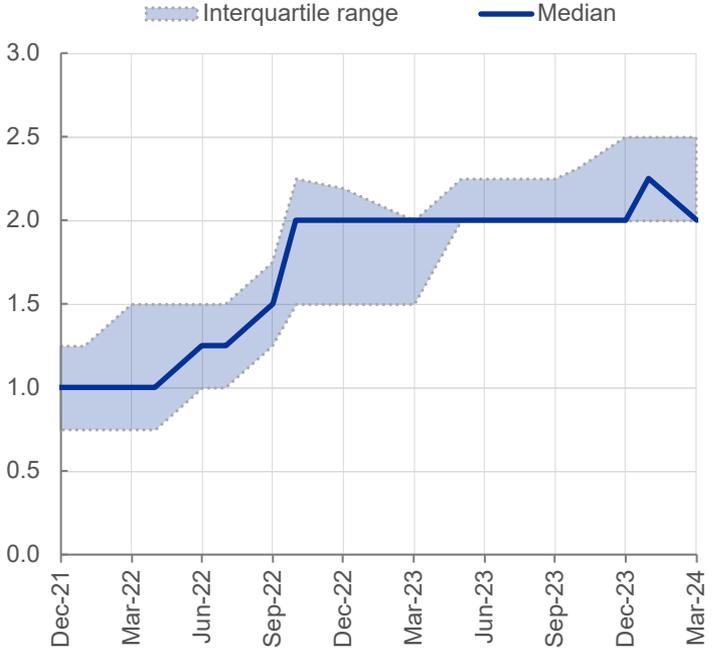
Source: SMA.
Notes: DFR denotes the ECB's deposit facility rate.

Model-based real r* estimates for the euro area
(percent)
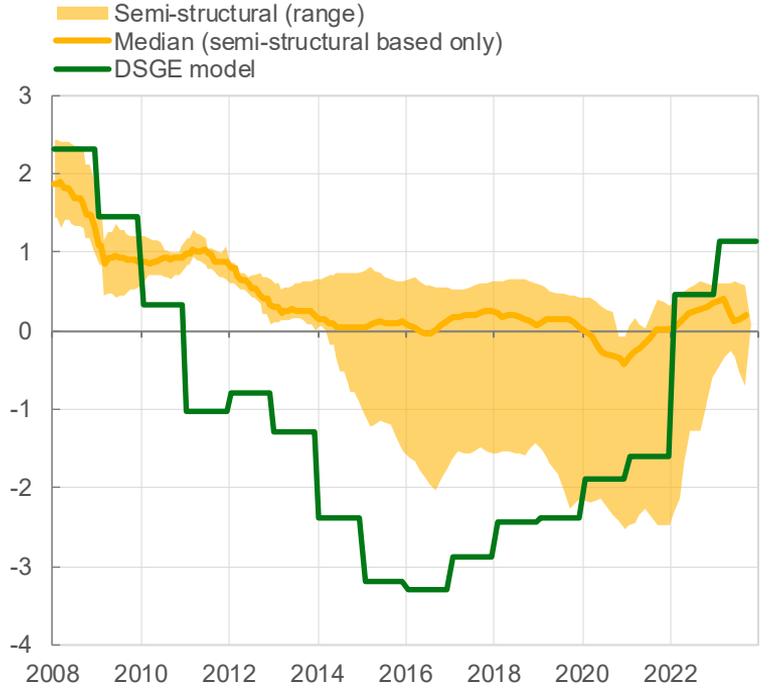
Source: ECB Economic Bulletin, Issue 1/2024.
Notes: Based on Eurosystem estimates as detailed in Brand, Lisack, Mazelis: "Estimates of the natural interest rate for the euro area: an update" - Box 7 of the ECB Economic Bulletin, Issue 1/2024. The median referred to in this chart is composed of semi-structural models only, differently from the median depicted in Box 7 of the ECB Economic Bulletin, Issue 1/2024 where also term structure-based models and survey measures are included.
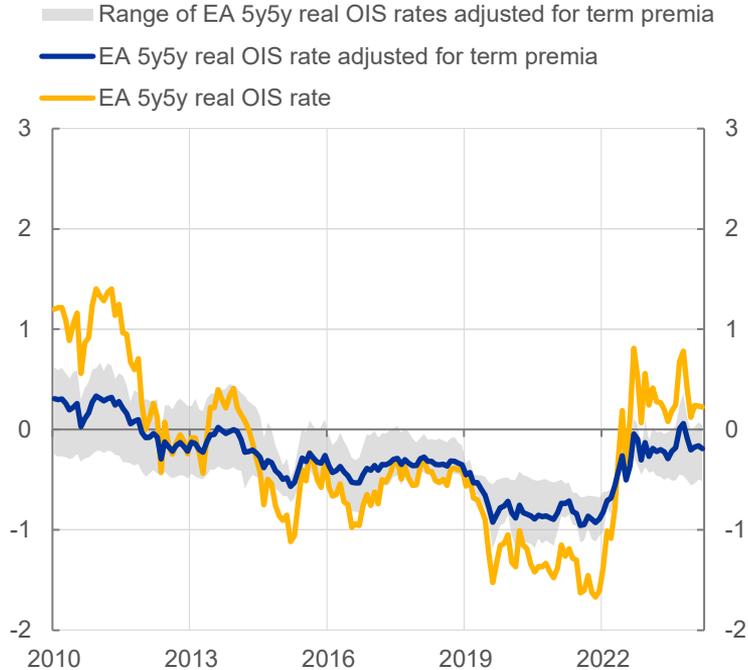
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Markets are pricing higher real rates over the long run, especially in the US

Euro area 5y5y real rate
(percentages per annum)

Range of EA 5y5y real OIS rates adjusted for term premia

EA 5y5y real OIS rate adjusted for term premia

EA 5y5y real OIS rate


Sources: Bloomberg, LSEG, and ECB calculations.
Notes: The premia-adjusted real rate is calculated as the difference between the premia-adjusted OIS rate and the premia-adjusted ILS rate. Model estimates for premia-adjusted forward OIS rates are based on two affine term structure models, one with and one without survey information on interest rate expectations (both variations of Joslin, Singleton and Zhu (2011)), and a lower bound term structure model following Geiger and Schupp (2018) incorporating survey information on interest rates expectations. Premia-adjusted forward ILS rates are average estimates from two affine term structure models as in Joslin, Singleton and Zhu (2011) applied to ILS rates non-adjusted for the indexation lag; see Burban et al. (2022), ECB Economic Bulletin Issue 8, 2021, Box 4. The range shows the minimum and maximum premia-adjusted real rates based on the three term structure models. Latest observation: March 2024 (monthly data).

US 5y5y real rate
(percentages per annum)

US 5y5y real OIS rate adjusted for term premia

US 5y5y real OIS rate

Sources: Haver, ECB calculation.
Notes: Series on real rate expectations based on D'Amico, Kim and Wei (DKW).
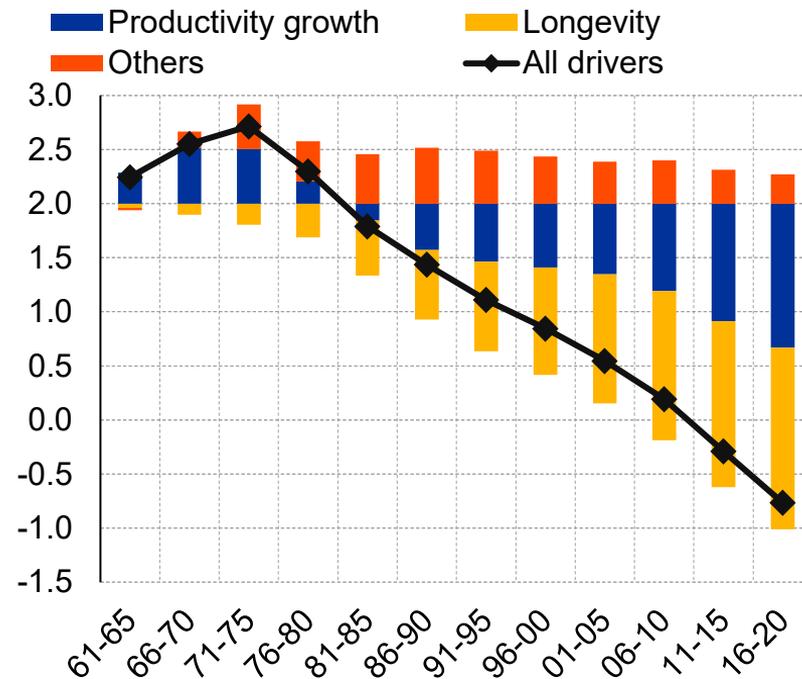Latest observation: 29 February 2024 (monthly updates, daily data).

Decline in global r* mainly due to slowing productivity growth and rising longevity

A global model of real interest rates
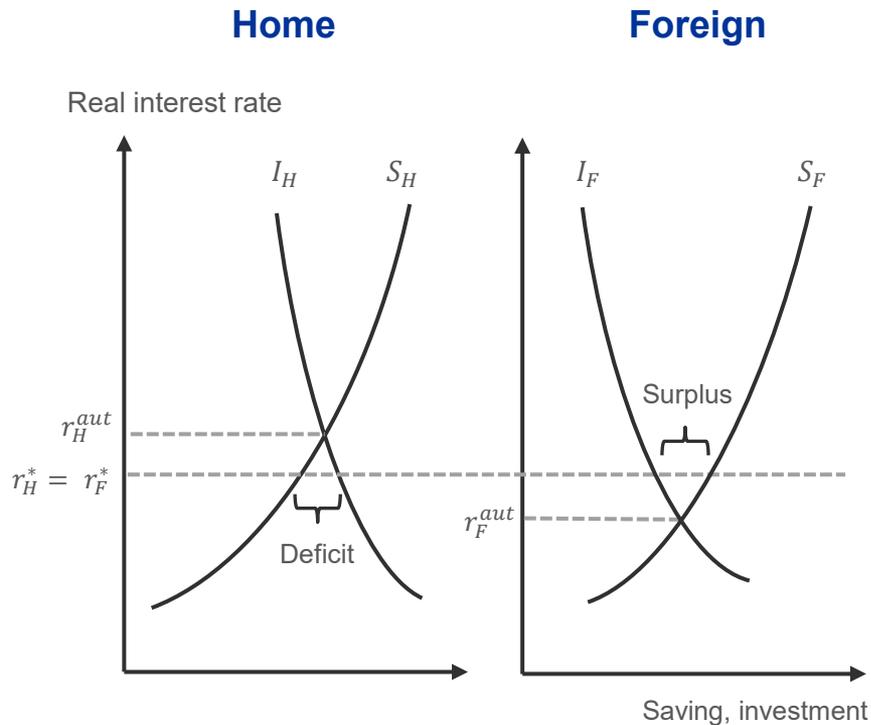
Source: Obstfeld, 2023.
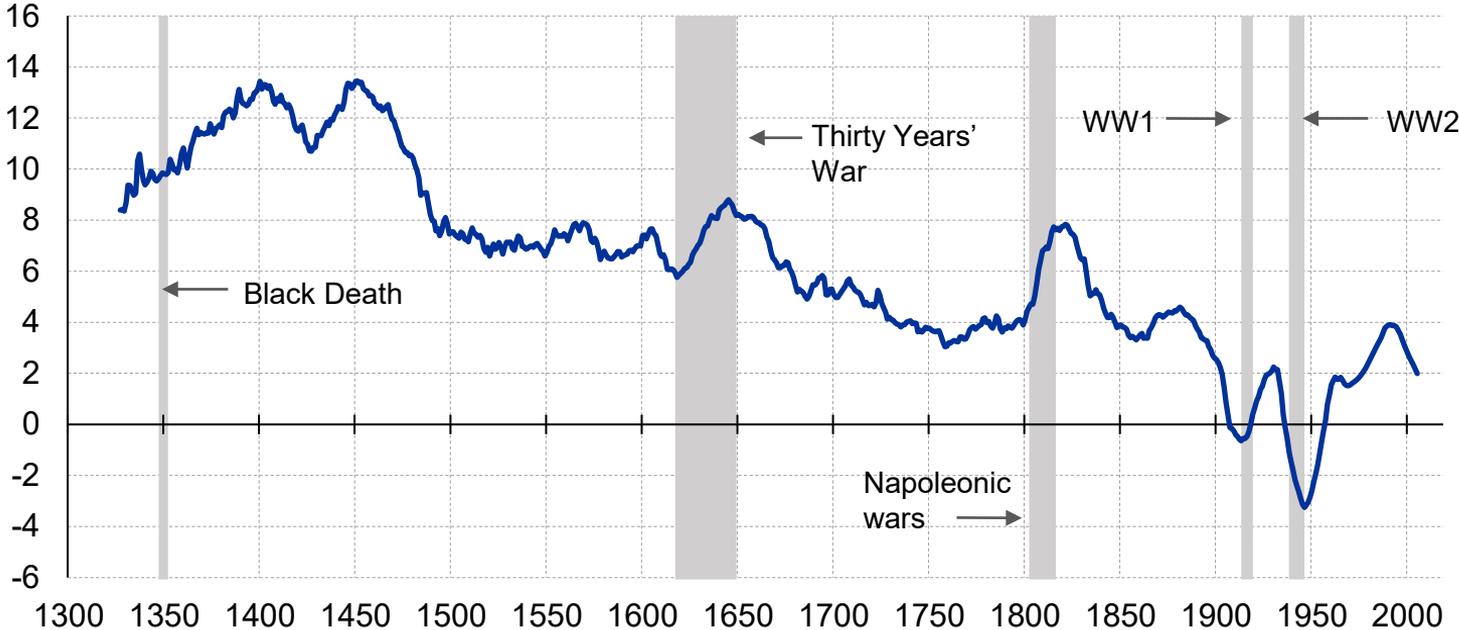
Decomposition of the drivers of global r*
(percent)

Source: Cesa-Bianchi, A., Harrison, R., & Sajedi, R. (2023).

Long-run trend in the global real interest rate
(percent)

Sources: Rogoff, Rossi and Schmelzing (2022) and ECB staff calculations.
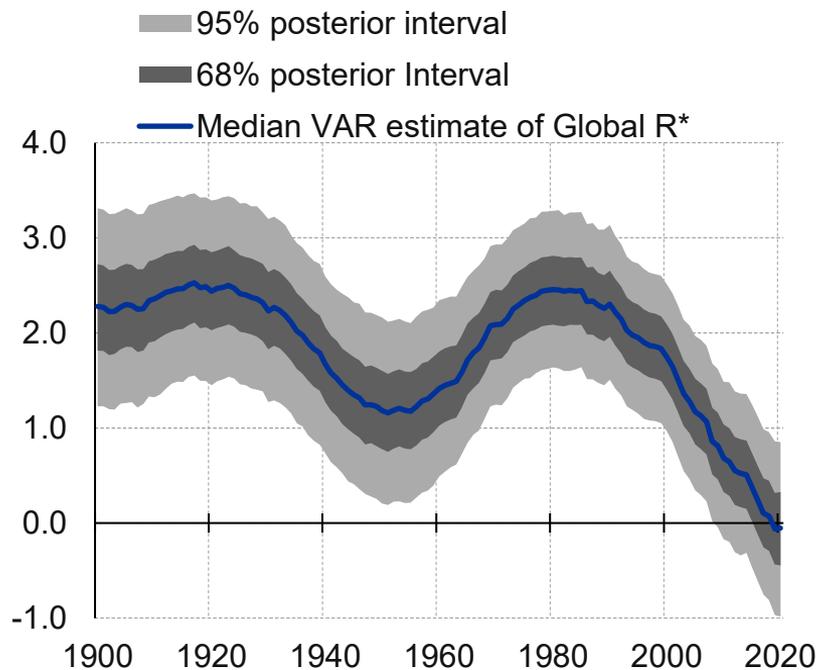Notes: Series displays the filtered trend component calculated from global real rate series provided by Schmelzing (2020) and applying the Baxter King filter. The series is inspired by Figure 3 in Rogoff et al. (2022).
Latest observation: 2005 due to filter application (sample: 1314-2018).

Long-run estimates of global r*
(percent)

Sources: Cesa-Bianchi, A., Harrison, R., & Sajedi, R. (2023). Decomposing the drivers of Global R*.
Notes: The solid blue line is the posterior median of the VAR estimate of Global R* following the approach of Del Nergo et al. (2019). All interest rates are annualised percentage rates.
Latest observation: 2020.
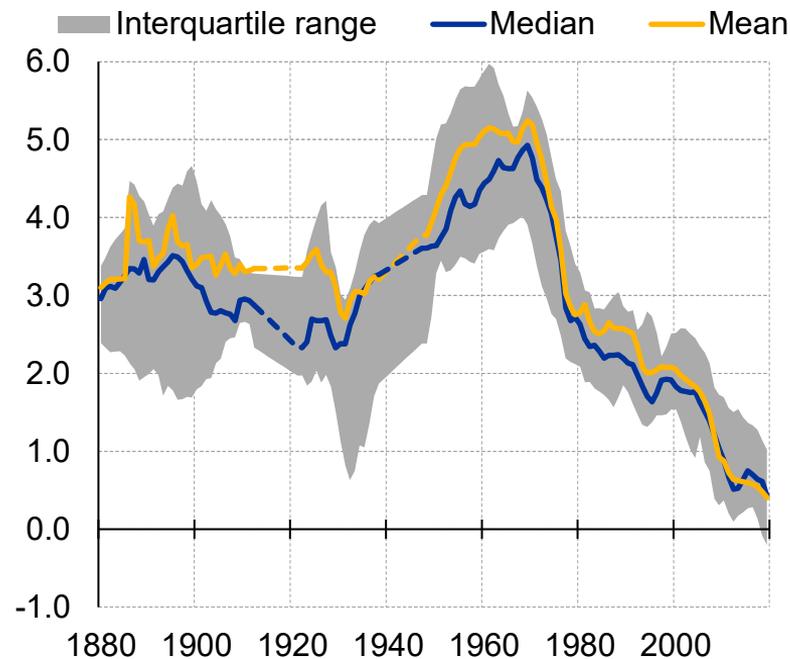
Sources: Grigoli, F., Platzer, J., & Tietz, R. (2023). Low for (Very) Long? A Long-Run Perspective on r* across Advanced Economies.
Notes: The mean, median and interquartile range are calculated from a cross-section of r* estimates for advanced economies. The dashed line portions correspond to observation during the war periods (1913-1921 and 1939-1947) which are excluded from the estimation of r*.
Latest observation: 2019.

Climate change and artificial intelligence require exceptionally high investments

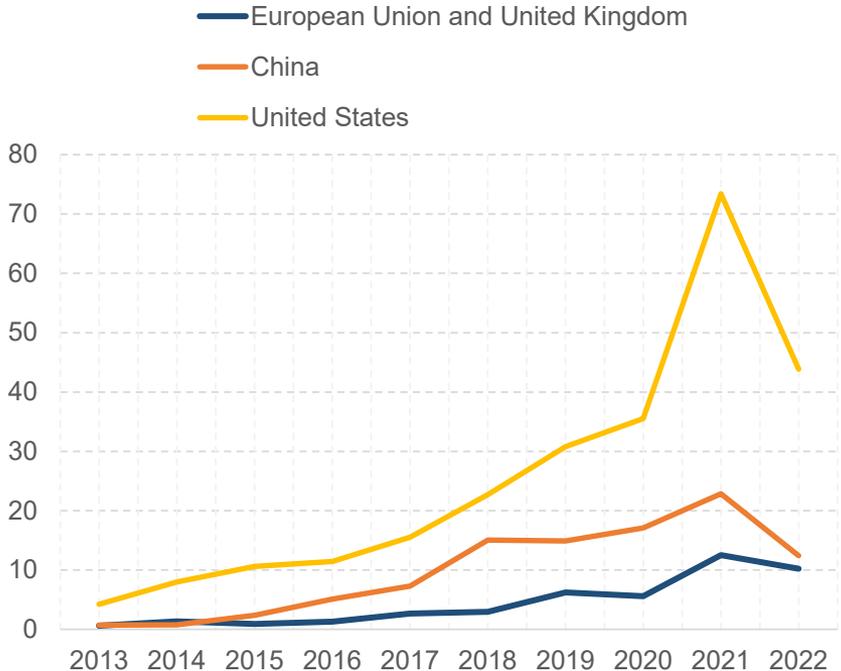## Billion-dollar climate disasters in the US
(Number of disasters)
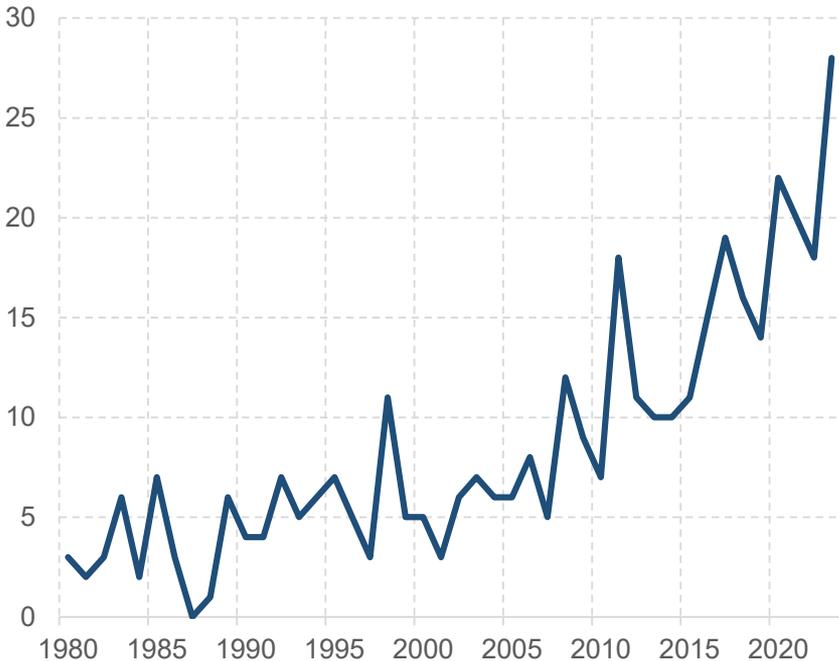
Annual private investment in artificial intelligence
(US dollar billion)

- European Union and United Kingdom
- China
- United States

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Past and future trends in near-shoring, diversifying and/or friend-shoring the location of production/operations
(percentages of responses)

■ Into the EU
■ Neither into nor out of the EU
■ Out of the EU
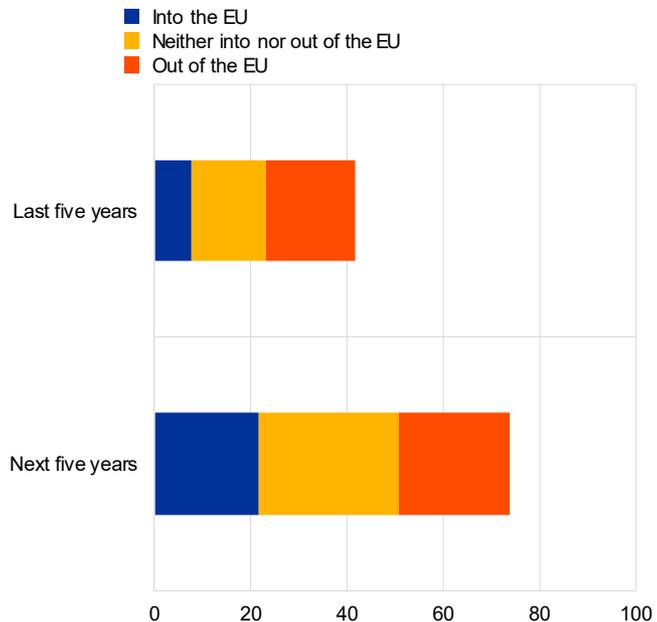
Importance of factors for moving production/operations into or out of the EU
(percentages of responses)

■ Into the EU
■ Out of the EU

Geopolitical risk/uncertainty
Climate change
Regulation
Transport costs
Financial incentives
Access to inputs
Energy costs
Local content requirements
Tariff requirements
Cost of inputs
Labour (cost, skills, shortages)
Brexit
Informal administrative
Geographical distribution of sales
Technological change
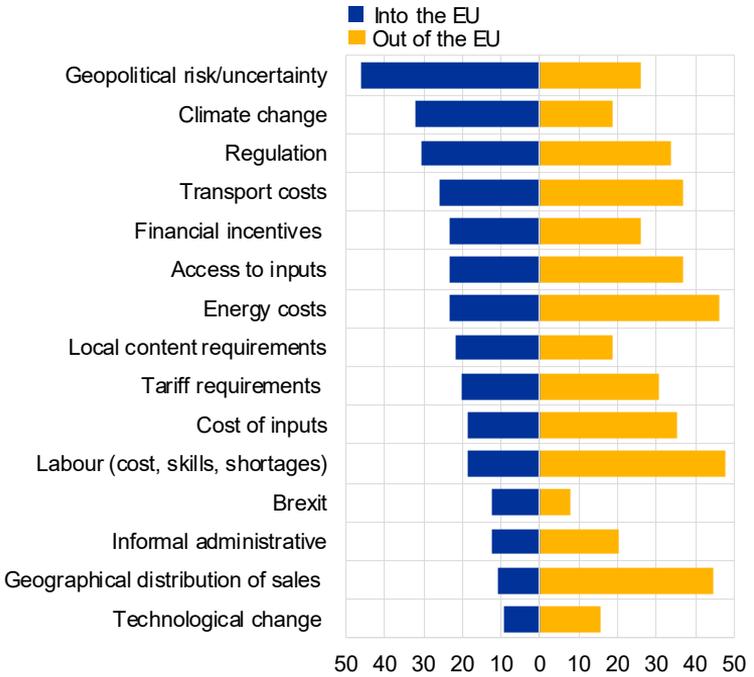
Correlation between real interest rates and saving-investment factors

| Factor	Expected relationship	1985-2016	1870-2016
Marginal product of capital	+	**0.65*****	-0.16
GDP growth	+	**0.37****	*-0.27****
TFP growth	+	**0.49*****	*-0.34****
Dependency ratio	+	-0.02	**0.41*****
Broad dependency	+	**0.87*****	NA
Life expectancy	-	**-0.87*****	**-0.45*****
Relative price of capital	+	**0.36****	*-0.43****
Inequality	-	**-0.53*****	*0.45****
Public debt	+	*-0.80****	*-0.22****
Fiscal balance	-	-0.11	0.11

Source: Borio, Disyatat, Juselius and Rungcharoenkitkul (2022).
***/**/* denotes results significant at the 1/5/10 percent level. Significant correlation with signs consistent with saving-investment theory is shown in bold, while incorrectly signed significant correlations are shown in italics. War years are excluded. Broad dependency ratio covers emerging market economies' demographic information. Since the series is only available from 1960 onwards, only the correlation over the recent sample is reported.

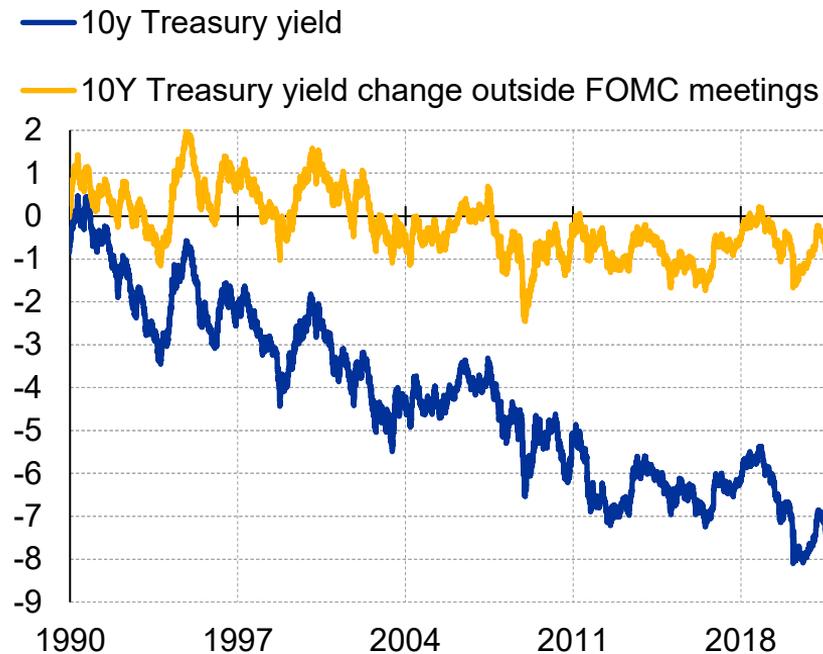# Decline in US real yields explained by narrow time windows around FOMC meetings

10y Treasury yield 3-day window around FOMC meetings
(percent)

— 10y Treasury yield

— 10y Treasury yield change around FOMC meetings
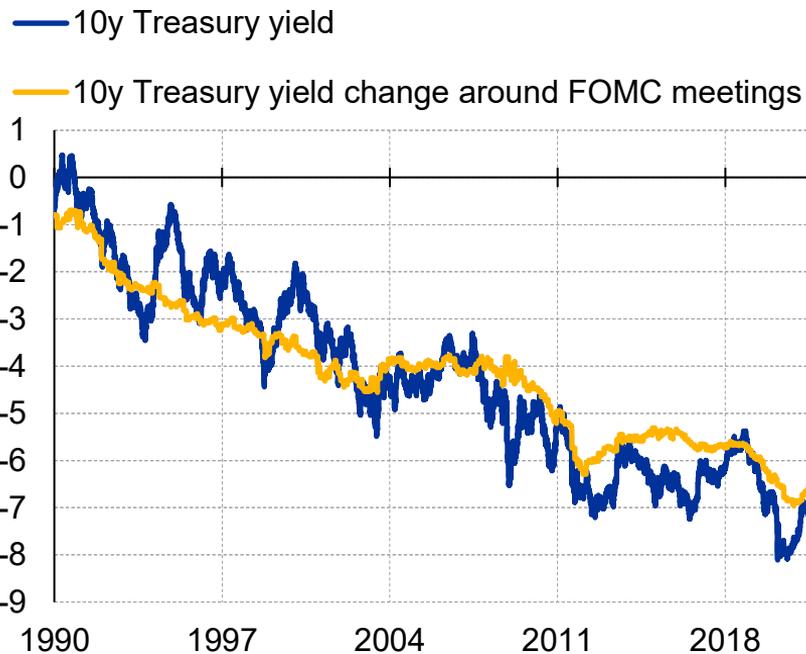
10y Treasury yield 3-day window outside FOMC meetings
(percent)

— 10y Treasury yield

— 10Y Treasury yield change outside FOMC meetings

Sources: LSEG and ECB staff calculations.
Notes: Calculated following the methodology as outlined by Hillenbrand (2022). The blue line (both panels) shows the actual evolution of the 10-year U.S. Treasury yield. The yellow line in the left chart shows a hypothetical time series that is constructed by taking into account only the yield changes that were realized in the 3-day window around FOMC meetings; in the left chart the yellow line indicates the yield changes that occurred on all days outside of this window.
Latest observation: June 2021 (following Hillenbrand, 2022).

Thank you very much for your attention!