Global Economic Outlook

——— April 2023

CNB CZECH NATIONAL BANK

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I. Introduction

The international community has once again, by an overwhelming majority, called on Russia to immediately end the war in Ukraine. This time, the appeal came from representatives from the world of finance during the spring meetings of the International Monetary Fund (IMF) and the World Bank. The human and material losses stemming from this needless conflict are now astronomical, as pointed out in the IMF global economic outlook.

The IMF slightly lowered the global economic growth outlook for both this year (2.8%) and the next (3.0%) in its April forecast. It reduced the outlook for advanced, emerging market and developing economies. The medium-term growth outlooks for the global economy are not rosy either, as they expect average GDP growth of just 3%, one of the worst global forecasts in the last few decades. The good news is that GDP growth in both the USA and the euro area is expected to be slightly higher this year than was assumed in January.
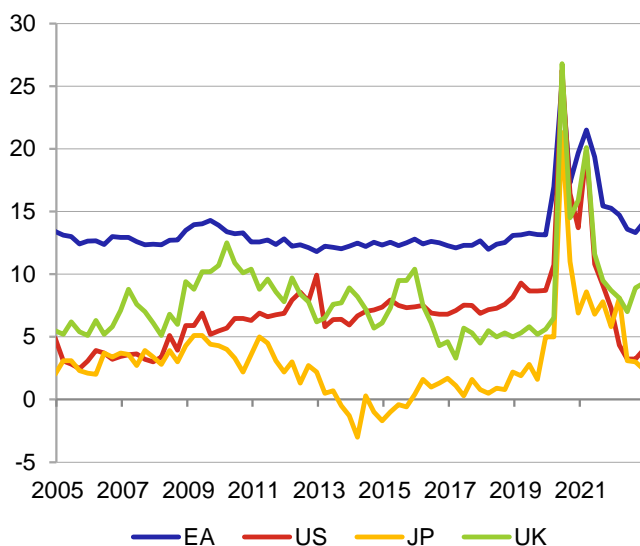
However, a high albeit gradually receding inflation wave will continue to weigh on the global economy. According to the IMF, the inflation wave has started to subside, as central banks have markedly raised interest rates (the key ones, combined with quantitative tightening). Prices of energy and food commodities have also dropped. Nevertheless, underlying inflation pressures persist, according to the IMF. This is also aided in many economies by a tight labour market situation. However, central banks' rising interest rates are not just affecting the demand side of the economy, but may also foster tensions and vulnerabilities in the banking and financial sectors due to their side effects. There are also fiscal tensions, where budgets somehow still cannot get back on track towards sustainable deficits.

Household saving rate over the last 20 years, %

Source: Eurostat, ons.gov.uk, FRED, esri.cao.go.jp
Note: Seasonally adjusted data

The chart in the current issue shows household saving rates in major advanced economies. Their surge in 2020 was caused by limited options to consume, disrupting what were until then common behaviour patterns. The saving rate in Europe has gradually returned to its previous level but has dropped in the USA, especially last year. The different household saving rates are reflected mainly in real consumption, which has remained stable in the USA so far but has fallen in Europe. Households' lower willingness to spend was reflected mainly in weak euro area economic growth in 2022.

The current issue also contains an analysis: The inverted yield curve: economic recession on the horizon. The article draws attention to the fact that the slope of the yield curve for fixed-income US government instruments has been negative for several months now, a phenomenon that has mostly reliably predicted the onset of recessions in the USA in the past 50 years.

GEO Barometr for selected countries

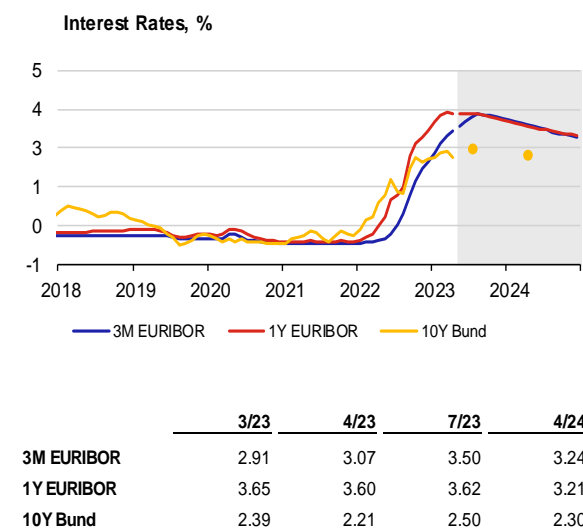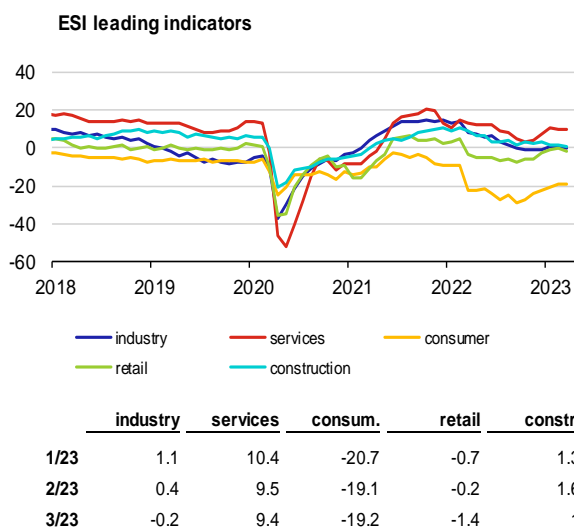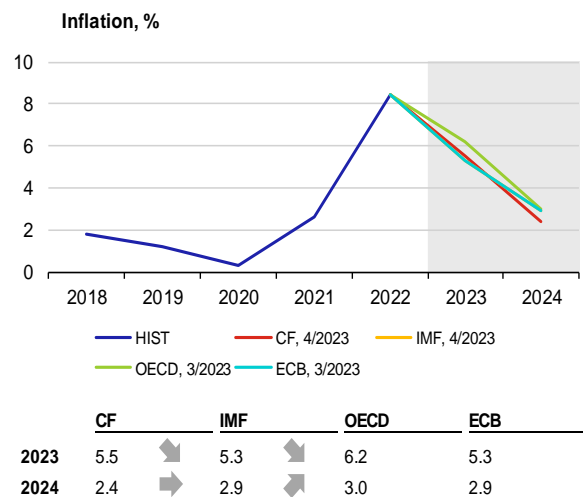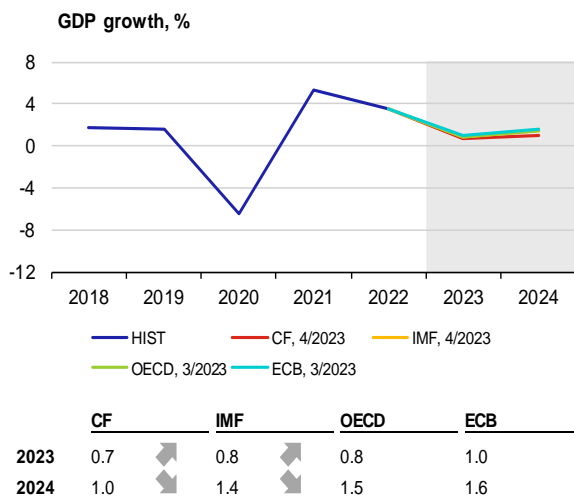|		EA		DE		US		UK		JP		CN		RU	
GDP	2023	0.7	↗	0.1	↗	1.1	↗	-0.2	↗	1.1	↗	5.5	↗	-1.4	↗
(%)	2024	1.0	↘	1.2	↘	0.7	↘	0.8	↗	1.1	→	5.1	↘	1.3	→
Inflation	2023	5.5	↘	6.1	↗	4.3	↗	6.4	→	2.5	↗	2.2	↘	6.0	↘
(%)	2024	2.4	→	2.7	→	2.6	→	2.8	↘	1.4	↗	2.4	→	4.7	↘
Unemployment	2023	6.8	↘	5.5	→	3.9	↘	4.2	↘	2.5	→	3.5	↘	3.5	↘
(%)	2024	6.8	↘	5.4	→	4.7	↗	4.2	↘	2.4	→	3.5	↘	3.6	↘
Exchange rate	2023	1.11	↗	1.11	↗			1.25	↗	125.7	↘	6.71	↘	78.8	↗
(against USD)	2024	1.14	↗	1.14	↗			1.28	↗	121.5	↘	6.59	↗	79.8	↗

Source: Consensus Forecasts (CF)
Note: The arrows indicate the direction of the revisions compared with the last GEO.

II.1 Euro area

The outlooks for economic growth in the euro area have improved slightly in the last month. The IMF's new forecast expects GDP growth of 0.8% this year, while CF analysts have raised their estimates to 0.7%. Next year, economic activity is expected to pick up a bit more and grow by around 1.2%, which is also the pace of the current long-term (6- to 10-year) CF outlooks for the euro area. However, a certain dichotomy is returning to the economy, as developments in the services sector are quite optimistic, while the performance and prospects of industry are less convincing. The composite PMI rose further in March (to 53.7), but only thanks to the services sub-index. The indicators for industry and construction dropped and remain in the contraction band, mainly due to falling orders. The same was also confirmed by the March ESI survey, which indicated a worsening of sentiment particularly in manufacturing, retail and construction. The ZEW index also fell sharply in response to financial markets shocks. Despite that, the results in industry are not bad at all, as production grew at a decent rate in January and February (by 1.0% and 1.5% month on month respectively; released after the April CF and the IMF forecasts). Real retail sales remain around 2.5% lower than a year ago. In month-on-month terms, however, they have long been broadly flat.

The persistence of inflation pressures in the euro area is causing some minor concern. Everything seems to be all right at first glance – annual headline inflation has been slowing steadily (to 6.9% in March, according to preliminary data). However, the month-on-month growth in consumer prices accelerated again and was quite rapid for the second consecutive month (0.9%). What is worse, core inflation is continuing to rise (to 5.7% year on year in March) and it is unclear when the trend could reverse. By contrast, the good news is the steadily slowing annual growth in producer prices (falling in month-on-month terms). The IMF lowered its estimate of average inflation this year to 5.3%. CF expects a slightly higher rate but also reduced its outlook in the new forecast. Inflation will slow further next year. However, the average rate will remain above the ECB's target. The ECB is expected to raise rates twice, by the standard 25 bp each time, at its upcoming meetings.

GDP growth, %

	CF		IMF		OECD	ECB
2023	0.7		0.8		0.8	1.0
2024	1.0		1.4		1.5	1.6

Inflation, %

	CF		IMF		OECD	ECB
2023	5.5		5.3		6.2	5.3
2024	2.4		2.9		3.0	2.9

ESI leading indicators

	industry	services	consum.	retail	constr.
1/23	1.1	10.4	-20.7	-0.7	1.3
2/23	0.4	9.5	-19.1	-0.2	1.6
3/23	-0.2	9.4	-19.2	-1.4	1

Interest Rates, %

|	3/23	4/23	7/23	4/24
3M EURIBOR	2.91	3.07	3.50	3.24
1Y EURIBOR	3.65	3.60	3.62	3.21
10Y Bund	2.39	2.21	2.50	2.30

II.2 Germany

The forecasts of economic activity for this year are starting to diverge against the backdrop of still high inflation. The IMF is more pessimistic in its new forecast, predicting a drop in GDP of 0.1% for this year (following its previous forecast of a 0.1% rise). By contrast, according to the new CF outlook and the leading German Kiel Institute, the German economy is expected to grow in 2023 (by 0.1% and 0.5% respectively). However, a strong economic recovery is not generally expected this year given the drop in consumer expenditure as a result of high inflation, which is reducing households' disposable incomes. For 2024, however, forecasts predict more or less the same GDP growth exceeding 1%. The composite PMI rose from 50.7 in February to a 10-month high in March (52.6), recording its second month of growth in a row having declined for seven consecutive months since January (thus indicating the fastest private sector expansion since last May). The growth in activity was driven by the services sector (53.7 as against 50.9 in February), while manufacturing continued to fall (44.7 as against 46.3 in February). The business climate remained optimistic in March. The Ifo index increased for the fifth consecutive month. The improvement in business sentiment was due mainly to expectations regarding future developments. By contrast, the ZEW index declined, but expectations are still positive. Consumer sentiment as measured by the GfK index continues to pick up, although much more slowly than in the previous months.

Annual consumer inflation slowed considerably in March following a slight acceleration in the previous month. German prices measured by the harmonised index rose by 7.8% (following growth of 9.3% in February), slightly exceeding expectations. The slowdown in inflation was due mainly to a sharp drop in energy price inflation (fostered, among other things, by government energy support measures), which outweighed the acceleration in food price inflation. However, core inflation, a better indicator of underlying price pressures, increased. The new IMF and CF outlooks expect inflation of around 6% in 2023 and around 3% in 2024. Industrial producer price inflation has been slowing for several consecutive months now and was down from 17.6% in January to 15.8% in February.

GDP growth in selected euro area countries in 2023 and 2024, %
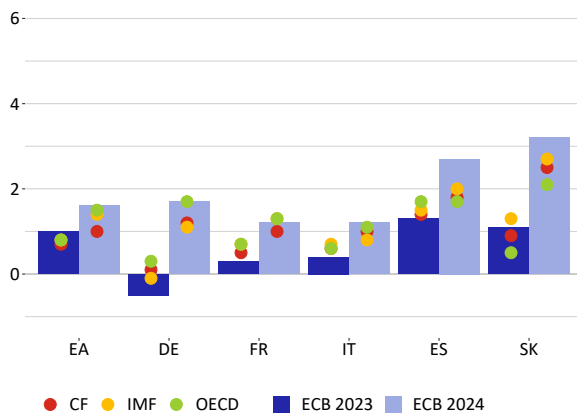
Inflation in selected euro area countries in 2023 and 2024, %
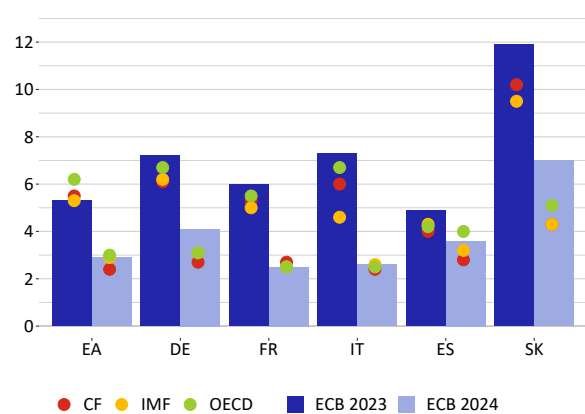
ESI leading indicators
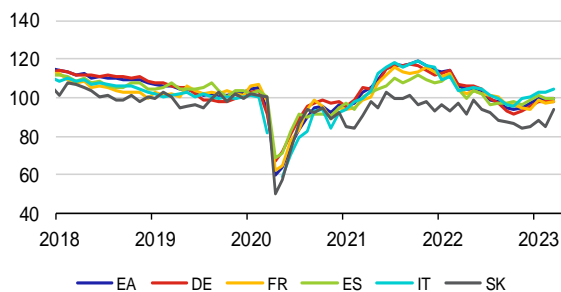
Economic and inflation surprises in the euro area, %

	EA	DE	FR	ES	IT	SK
1/23	99.7	98.0	98.5	101.6	102.6	88.1
2/23	99.6	98.0	97.3	99.6	102.6	84.8
3/23	99.3	97.9	98.0	99.7	104.6	93.7
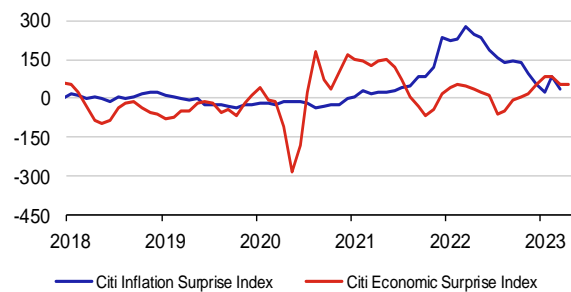
Inflation expectations based on 5year inflation swap and SPF

	5y5y	SPF
2/23	2.39	2.12
3/23	2.40	2.12
4/23	2.41	

II.3 United States

The outlooks for US economic growth this year have shifted towards faster rates, but the likelihood of a recession this year is also growing. CF analysts' new outlook expects GDP to grow by 1.1% this year, while in January, the expected growth was just above zero (0.3 %). The new IMF outlook is even more optimistic, with growth of 1.6% expected this year. By contrast, the Fed predicts an increase of just 0.4%. OE predicts growth of 1%, as does a survey of Bloomberg analysts. Despite the higher forecasted annual growth for 2023 as a whole, a recession is still expected – it will most likely occur in Q3 according to the analysts, although their estimates differ. OE estimates that a recession will hit in late 2023/early 2024. An approaching recession may also be signalled by the still inverted yield curve.

Consumer price inflation slowed more than expected in year-on-year terms in March, but core inflation accelerated. The inflation outlooks for this year have shifted higher. Consumer price inflation fell to 5% in March, i.e. 0.2 pp below market expectations and 1 pp lower than in February. However, core inflation reached 5.6% year on year and 0.4% month on month, indicating persisting inflation pressures. Energy prices fell by 6.4% in year-on-year terms, while food prices rose by 8.5% and services prices by 7.1%. Consumers' unwillingness to spend was reflected in a month-on-month drop in retail sales of 1%.

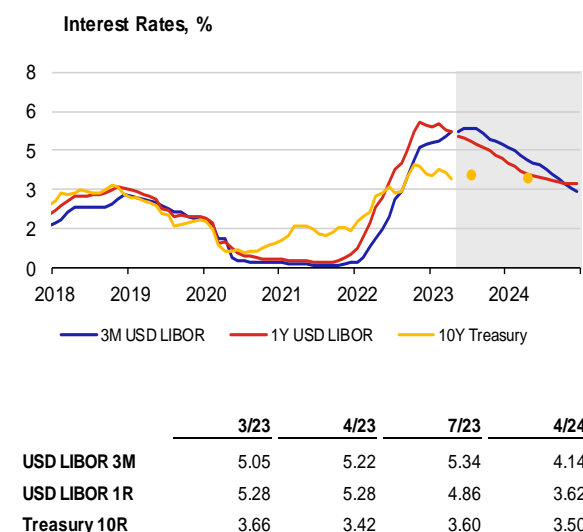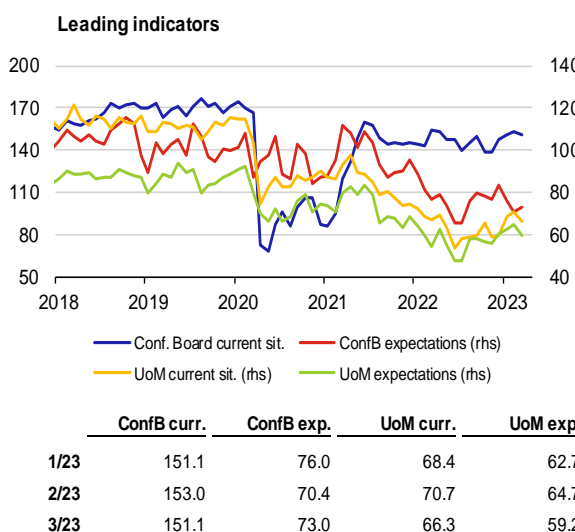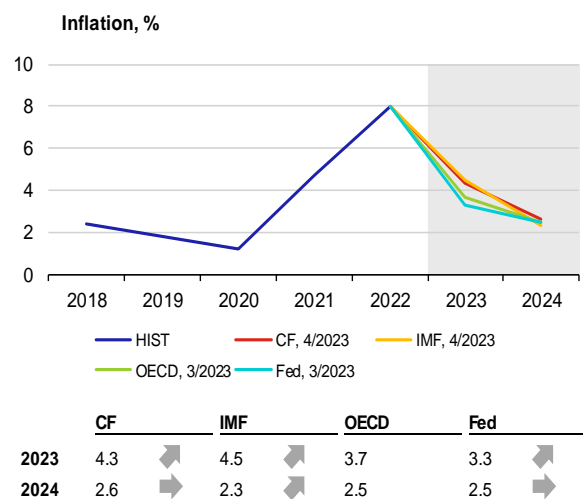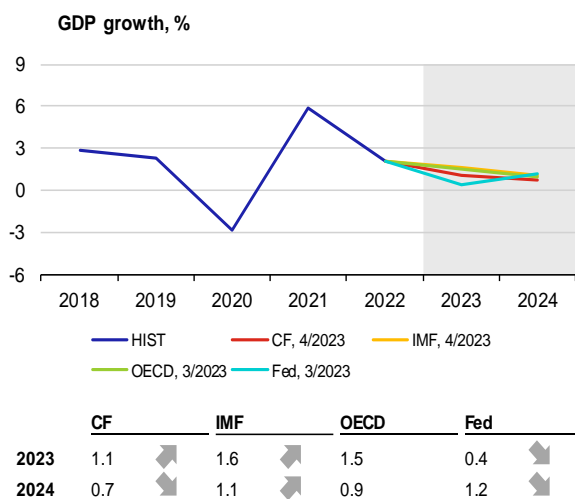**The US Fed raised rates by 0.25 pp at its March meeting and is expected to do the same in early May.** The Fed expected rates to be above 5% this year in its March forecast. The market expects rates to go up to 5.25% at the May meeting. According to the analysts, this could be the last increase, after which rates will probably stay at this level for some time before decreasing. Non-farm payrolls rose by 236,000 in March. This is signalling a slowdown in the growth of new jobs (compared to the previous months), but the market is still not cooling fast enough to satisfy the Fed.

GDP growth, %

Inflation, %

	CF		IMF		OECD	Fed	
2023	1.1	↗	1.6	↗	1.5	0.4	⇅
2024	0.7	⬇	1.1	⬇	0.9	1.2	

	CF		IMF		OECD	Fed	
2023	4.3	↗	4.5	↗	3.7	3.3	⇅
2024	2.6	➡	2.3	↗	2.5	2.5	➡

Leading indicators

Interest Rates, %

	ConfB curr.	ConfB exp.	UoM curr.	UoM exp.
1/23	151.1	76.0	68.4	62.7
2/23	153.0	70.4	70.7	64.7
3/23	151.1	73.0	66.3	59.2

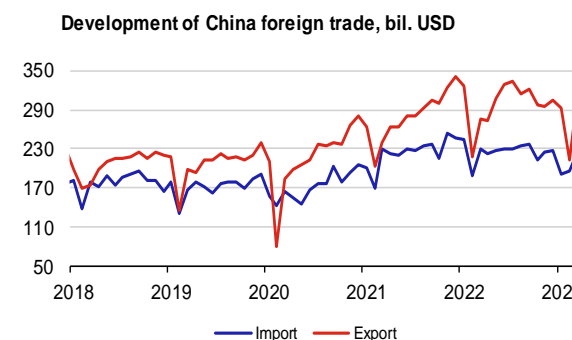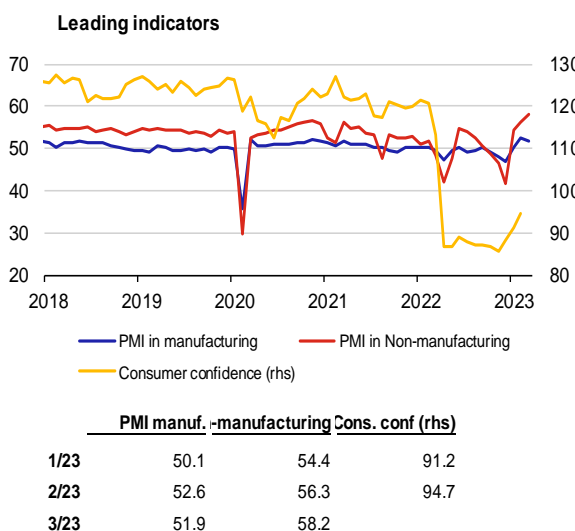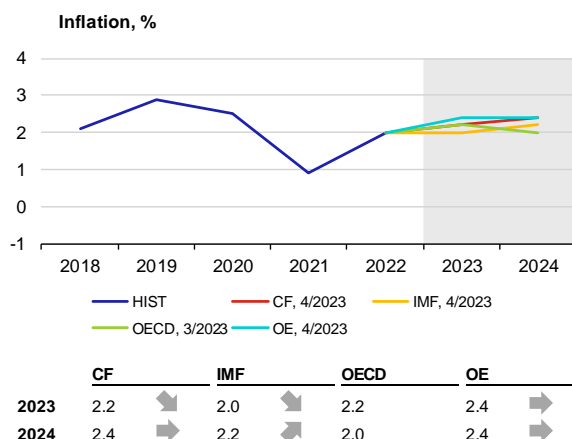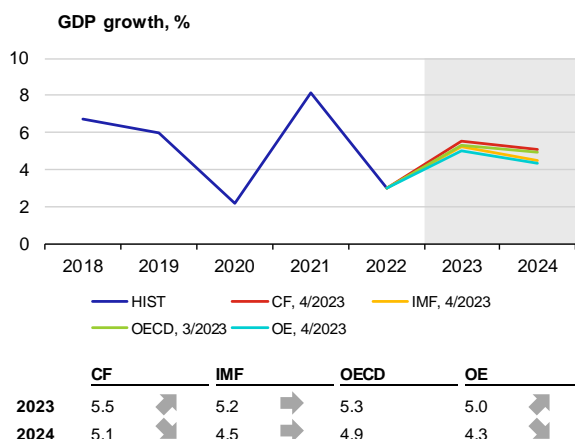|	3/23	4/23	7/23	4/24
USD LIBOR 3M	5.05	5.22	5.34	4.14
USD LIBOR 1R	5.28	5.28	4.86	3.62
Treasury 10R	3.66	3.42	3.60	3.50

II.4 China

According to most observers, China experienced relatively robust growth in 2023 Q1 (the official number is 4.5%). This view is supported by many of the leading indicators for the first months of the year. However, this growth will have to rely more than before on domestic demand due to a widely anticipated slowdown in the economies of China's major trading partners among the advanced countries. This is evidenced, e.g., by the fall in the Caixin Manufacturing PMI (the sub-index closely linked to exports in manufacturing) to the bordeline value of 50 points at the start of April from 51.6 points a month earlier. Nonetheless, the volume of corporate loans and the value of monetary aggregates are growing. Conversely, the residential property price index continues to decline, albeit at a somewhat more modest pace than last year (-1.5% in January, -1.2% in February).

The latest quantitative business and consumer sentiment indicators remain in the expansion band. Business sentiment was only slightly weaker in March (51.9 points) than in February (52.6 points, which was an 11-year high), but was still safely in the expansion band. The services PMI has been growing since the end of the year and is currently at 57.8 points.

Annual consumer inflation remains positive (0.7% in March after 1% in February), but the contributions of recent months have been negative, especially for industrial goods. In month-on-month terms, however, consumer prices fell by 0.5% in February, and by another 0.3% in March after a surge in January. The PPI has been steadily decreasing month-on-month since October 2022. In March, the decline deepened to -2.5% year on year.

The decline in China's foreign trade volume has gradually halted since the start of the year. Positive export growth of 14.8% year on year was recorded in March, due mainly to the huge growth in exports to Russia. As regards export items, steel and steel semi-finished products dominated. Imports continued to fall year on year (by 1.4%), but far more slowly than a month earlier. The month-on-month values provide a somewhat different picture in qualitative terms: following a sharp drop in January, imports rose in the following two months. February recorded a similarly strong fall in exports, followed by an exceptionally strong recovery in March. Most forecasts count ont a return of foreign trade to sustained growth this year.

GDP growth, %

	CF		IMF		OECD	OE	
2023	5.5	↗	5.2	→	5.3	5.0	↗
2024	5.1	↘	4.5	→	4.9	4.3	→

Inflation, %

	CF		IMF		OECD	OE	
2023	2.2	↘	2.0	↘	2.2	2.4	→
2024	2.4	→	2.2	↗	2.0	2.4	→

Leading indicators

	PMI manuf.	-manufacturing	Cons. conf (rhs)
1/23	50.1	54.4	91.2
2/23	52.6	56.3	94.7
3/23	51.9	58.2	

Development of China foreign trade, bil. USD

Source: Bloomberg

II.5 United Kingdom

The UK economy saw moderate growth in 2022 Q4. According to revised data, GDP rose by 0.1% quarter on quarter. The economy, predicted to remain flat, thus demonstrated greater resilience than initially expected. However, the annual inflation figures were surprisingly unfavourable, unexpectedly rising to 10.4% in February (from 10.1% in January). This was mainly due to a rise in the prices of food and clothing and footwear. Core inflation also increased contrary to expectations, reaching 6.2% in February. Against the backdrop of these figures and despite banking sector shocks, the BoE raised its key interest rate for the eleventh consecutive month in March, by 0.25 pp to 4.25%. The BoE expects inflation to fall significantly in 2023 Q2 and is no longer expecting a technical recession this year. Compared to previous forecasts, the IMF and CF are more optimistic about GDP growth and inflation in 2023 and 2024. The composite P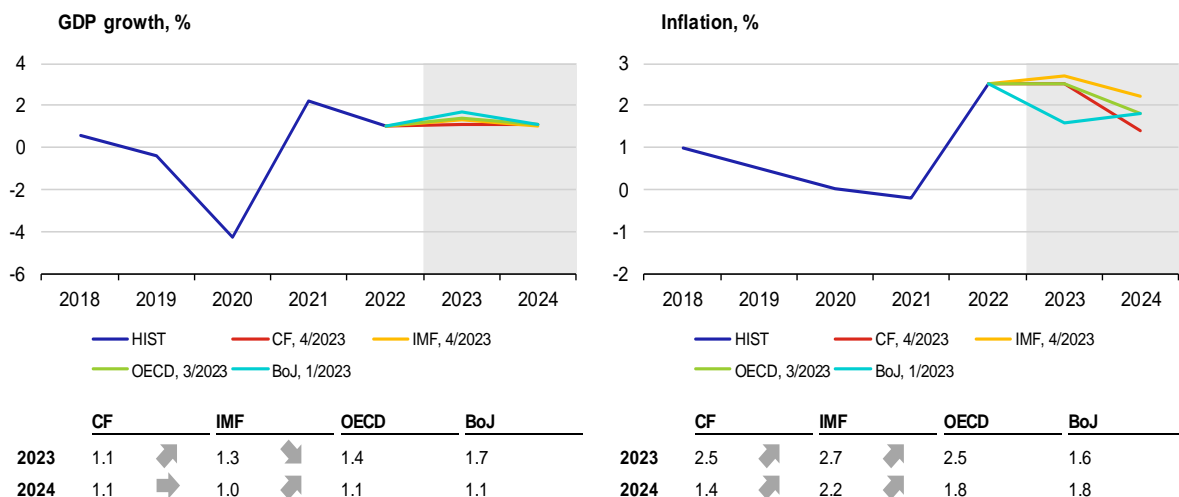MI fell slightly to 52.2 in March from an 8-month high of 53.1 in February, but stayed in the expansion band for the second consecutive month due to the robust services performance.

GDP growth, %

	CF		IMF		OECD	BoE
2023	-0.2	↗	-0.3	↗	-0.2	-0.5
2024	0.8	↗	1.0	↗	0.9	-0.3

Inflation, %

	CF		IMF		OECD	BoE
2023	6.4	→	6.8	↘	6.7	4.0
2024	2.8	↘	3.0	↘	2.8	1.5
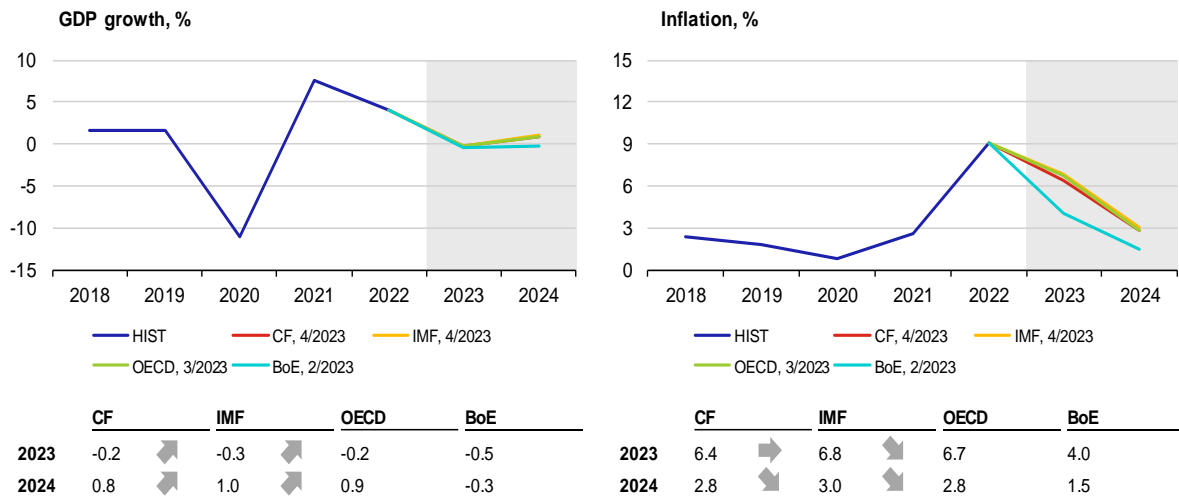
II.6 Japan

The new BoJ governor indicated a continuation of easy monetary policy, although signs of inflation are strengthening in Japan. At his first press conference, Governor Ueda expressed his support for both negative rates and the yield curve control policy. While consumer inflation slowed from 4.2% in January to 3.1% in February, the decline stemmed from government measures to reduce energy bills. Meanwhile, core inflation monitored by the BoJ rose to 3.4%, its highest level since 1982. Recent annual wage negotiations in spring (shunto) also suggest the end of the era of zero inflation. According to the unions, the average negotiated wage growth in larger companies was 2.3% compared to 0.5% in 2022. Stronger wage growth is also anecdotally confirmed by major wage increases announced in large companies such as industrial manufacturers Toyota, Honda, Nintendo, Canon and clothing retailer Uniqlo. By contrast, low median inflation (0.8%) is a dovish signal, indicating that price growth is concentrated and does not yet apply to most consumer goods and services.

GDP growth, %

	CF		IMF		OECD	BoJ
2023	1.1	↗	1.3	↘	1.4	1.7
2024	1.1	→	1.0	↗	1.1	1.1

Inflation, %

	CF		IMF		OECD	BoJ
2023	2.5	↗	2.7	↗	2.5	1.6
2024	1.4	↗	2.2	↗	1.8	1.8

II.7 Russia

The new data on inflation was reminiscent of the surge in prices which occurred a year ago. Annual inflation in Russia dec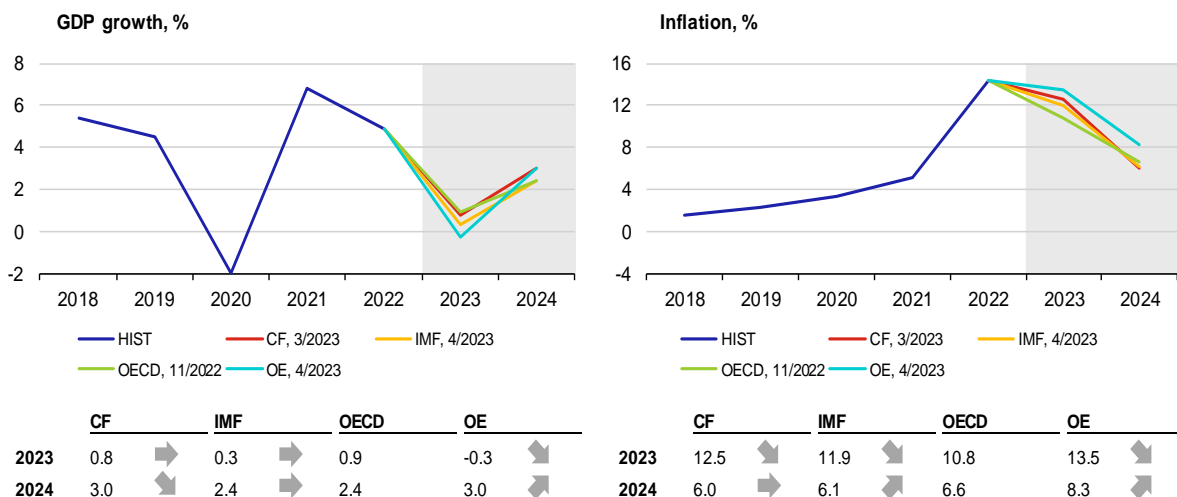lined dramatically from 11% in February this year to 3.5% in March, falling below the Russian central bank's 4% inflation target. The surprising improvement is due to base effects. Since the very start of the invasion of Ukraine, year-on-year growth in consumer prices accelerated from around 9% in February 2022 to almost 17% in March of that year. Inflation picked up for another month and then started to slow. The latest short-term indicators are favourable overall. The March PMI remains in the economic expansion band and even rose markedly in services, while the year-on-year decline in industrial production slowed in February. The GDP growth outlook is also more favourable for this year. The IMF improved its outlook by 0.4 pp compared to the January WEO update. Conversely, the IMF outlook for next year is 0.2 pp more pessimistic than in January.
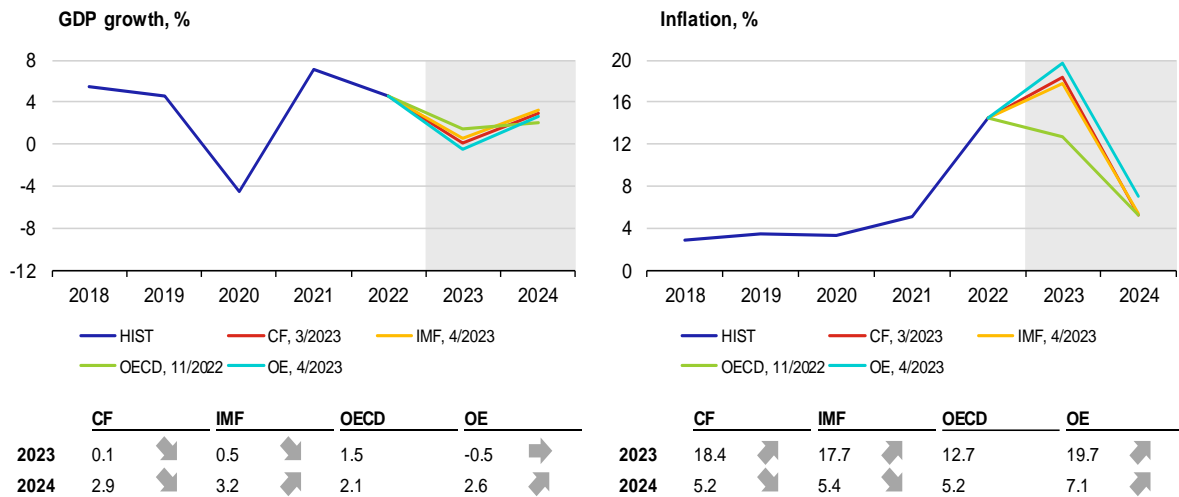

	CF		IMF		OECD	OE	
2023	-1.4	↗	0.7	↗	-2.5	0.1	↗
2024	1.3	→	1.3	→	-0.5	1.7	→

	CF		IMF		OECD	OE	
2023	6.0	↘	7.0	↗	6.4	5.1	↘
2024	4.7	→	4.6	↗	5.3	4.5	↘
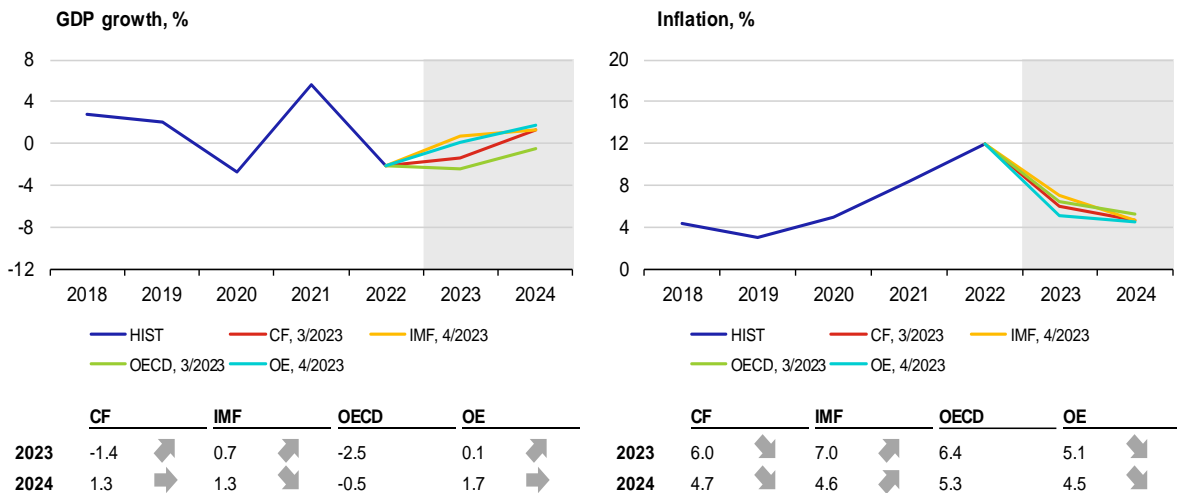
II.8 Poland

The latest outlooks saw slightly lower estimates for average inflation in 2023. The new IMF forecast expects roughly 12%, CF 12.5%. OE is traditionally more pessimistic in its outlook. However, consumer price inflation remains very high and is quite persistent. Inflation fell in March from an all-time high in February to 16.1% (1.1% month on month), but persisting inflation pressures are significant. The labour market is cooling only slightly. Employment fell slightly in February compared to January. However, nominal wage growth in the private sector remains high (over 13% year on year). The real drop in income is not significant enough to manifest itself in a stronger decline in demand. The year-on-year fall in retail sales in February is more a reflection of last year's base effects, when VAT was sharply reduced. The Polish central bank's interest rates remain unchanged. The outlook for real economic activity also remains unchanged.

	CF		IMF		OECD	OE	
2023	0.8	→	0.3	→	0.9	-0.3	↘
2024	3.0	↘	2.4	→	2.4	3.0	↗

|	CF		IMF		OECD	OE	
2023	12.5	↘	11.9	↘	10.8	13.5	↘
2024	6.0	→	6.1	↗	6.6	8.3	↗

II.9 Hungary

CF, MNB and IMF analysts all expect GDP growth to be more moderate in 2023, accompanied by higher-than-previously-expected inflation. The IMF has revised GDP growth, reducing the estimate by 1.3 pp. This may be due in particular to a markedly higher-than-expected year-on-year decline in industrial production. Retail sales and construction are similarly experiencing a decline. The slowdown in GDP growth this year was further fostered by reduced domestic demand stemming from lower real wages. The PMI in manufacturing remains in the expansion band (55), but the long-term trend suggests a gradual decline. Inflation remained above 25% in March (0.8% month on month). Despite falling energy and commodity prices, lower global demand and the MNB's tight monetary conditions, CF, OE and IMF analysts revised the inflation outlook for this year upwards. Excise duty on alcohol and tobacco products, which was implemented in July 2022 and is reflected in consumer prices, will contribute to higher inflation this year.

GDP growth, %

Inflation, %

	CF		IMF		OECD		OE	
2023	0.1		0.5		1.5		-0.5	
2024	2.9		3.2		2.1		2.6	

	CF		IMF		OECD		OE	
2023	18.4		17.7		12.7		19.7	
2024	5.2		5.4		5.2		7.1	

III. Leading indicators and outlook of exchange rates

OECD Composite Leading Indicator

EA   US   UK   JP   CN   RU

The US dollar (USD/EUR)
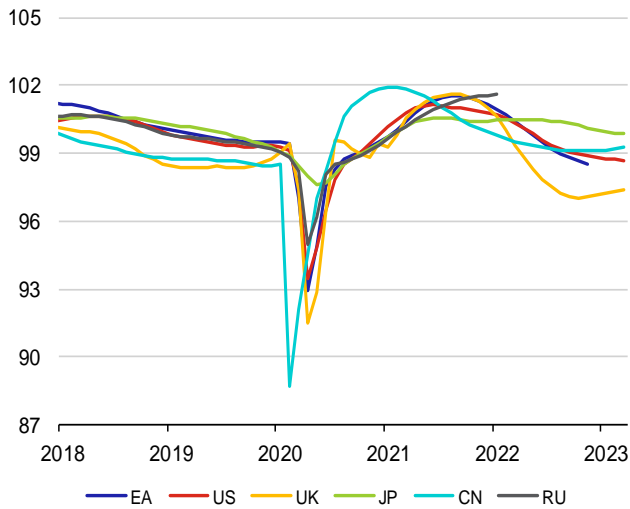
USD/EUR (spot)   CF forecast   forward rate
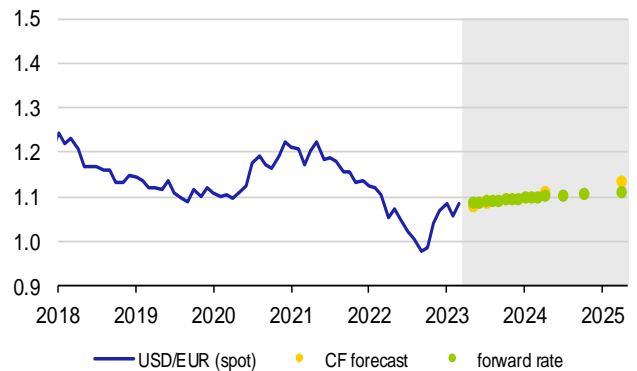
	10/4/23	5/23	7/23	4/24	4/25
spot rate	1.091				
CF forecast		1.082	1.088	1.112	1.135
forward rate		1.088	1.092	1.104	1.113

The British pound (GBP/USD)

GBP/USD (spot)   CF forecast   forward rate
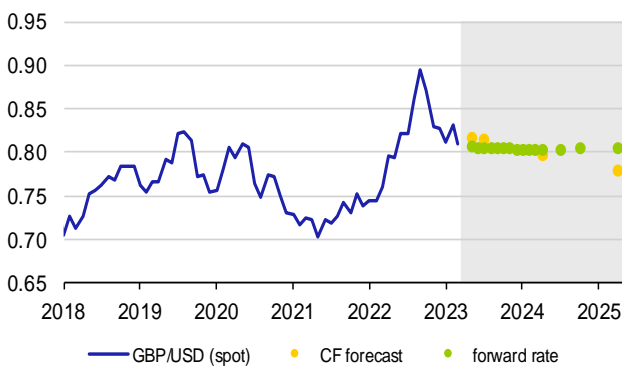
	10/4/23	5/23	7/23	4/24	4/25
spot rate	0.805				
CF forecast		0.818	0.815	0.799	0.780
forward rate		0.807	0.806	0.804	0.807

The Japanese yen (JPY/USD)

JPY/USD (spot)   CF forecast   forward rate
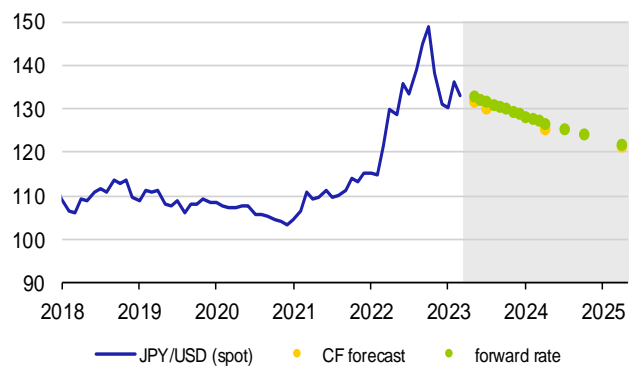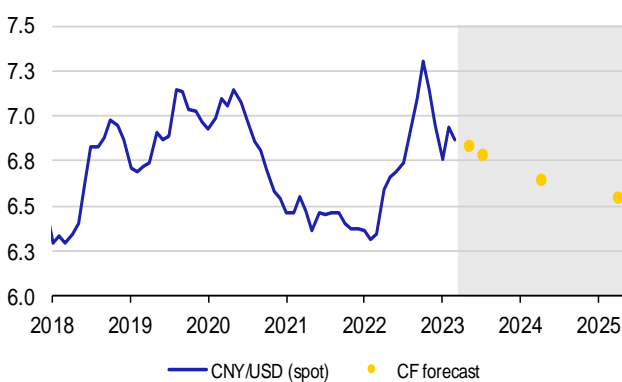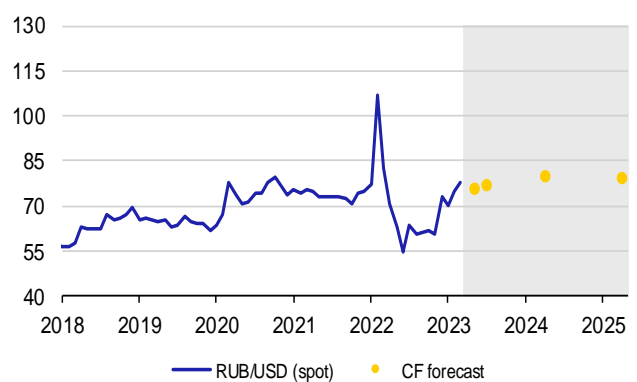
	10/4/23	5/23	7/23	4/24	4/25
spot rate	133.5				
CF forecast		132.0	130.2	125.7	121.5
forward rate		133.0	131.8	126.8	122.2

The Chinese renminbi (CNY/USD)

CNY/USD (spot)   CF forecast

	10/4/23	5/23	7/23	4/24	4/25
spot rate	6.885				
CF forecast		6.839	6.788	6.648	6.554

The Russian rouble (RUB/USD)

RUB/USD (spot)   CF forecast

	10/4/23	5/23	7/23	4/24	4/25
spot rate	82.08				
CF forecast		76.10	77.30	79.99	79.70

Note: Exchange rates as of last day of month. Forward rate does not represent outlook; it is based on covered interest parity, i.e. currency of country with higher interest rate is depreciating. Forward rate represents current (as of cut-off date) possibility of hedging future exchange rate.

IV.1 Oil

The Brent oil price fell sharply to a 15-month low in mid-March, but quickly returned to the previous range in early April in response to a cut in production quotas by OPEC+. The sharp drop to USD 70/bbl was due mainly to sell-offs in futures markets, where hedge funds quickly reduced their net long positions owing to fears of contagion in the US and European banking sector, which could negatively impact global oil demand. Lower demand from refineries due to strikes in France, growth in inventories in the USA and strong US oil exports to world markets also drove oil prices down. The oil price g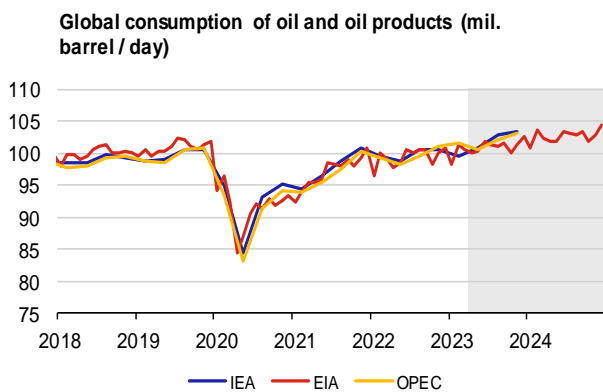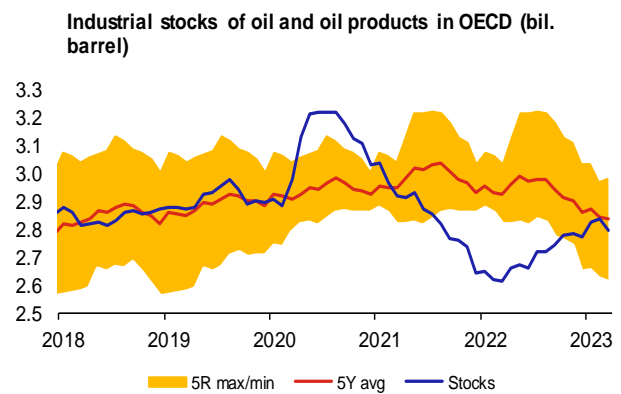radually erased part of the losses in the second half of March due to the easing of sell-offs on exchanges and the shutdown of the oil pipeline from northern Iraq to Turkey. A weakening dollar also partially contributed to the price increase. However, at the start of April, OPEC+ unexpectedly announced another voluntary cut in production quotas of 1.16 million barrels a day (b/d) from May to the end of 2023. Oil prices soared in response by around USD 5/bbl. Russia earlier announced a temporary cut in output of 500,000 b/d in March, which was later extended until June. In response to the move by OPEC+, it intends to maintain reduced output until the end of 2023, too. In mid-April, the Brent price rose above USD 85/bbl due to increasing tensions on the physical oil market. This was fostered by rising imports to China, a drop in exports from Russia, a fall in oil stocks in the USA and the ongoing shutdown of the Iraq–Turkey oil pipeline. While the EIA predicts a slight excess of oil on the market this year and an even larger one in 2024, despite the reduction in production quotas, OPEC expects a relatively strong supply deficit on the market in the rest of 2023. Its recent move can thus be understood more as a measure against speculative oil sell-offs.
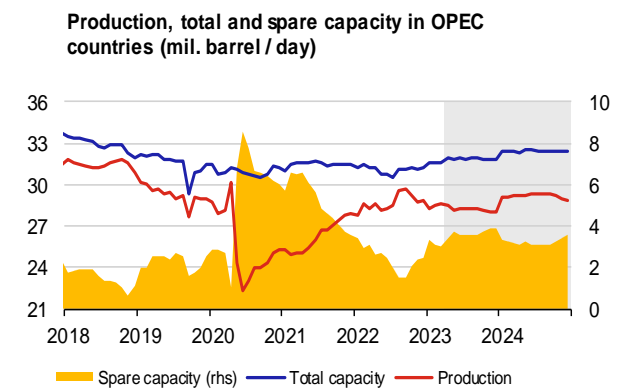
The market futures curve from mid-April (which does not yet fully take into account OPEC+ reduced oil production) signals the Brent price at USD 78 and 74/bbl at the end of 2023 and 2024 respectively. The EIA forecast expects the price to remain above USD 85/bbl until the end of this year and then to gradually decline to USD 78/bbl at the end of 2024.

Outlook for prices of oil (USD/barrel) and natural gas (USD / 1000 m³)
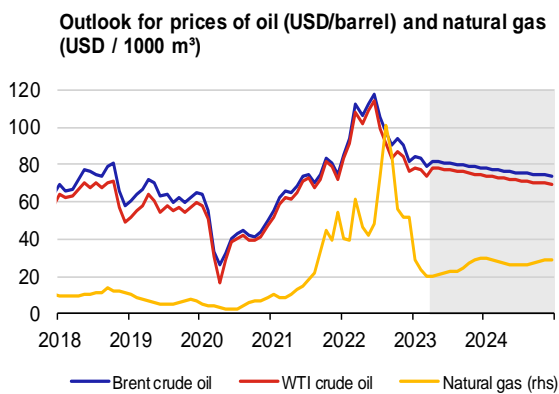
	Brent		WTI		Natural gas	
2023	80.56	↘	76.43	↗	606.76	↘
2024	75.81	↘	71.57	↘	692.98	↗

Industrial stocks of oil and oil products in OECD (bil. barrel)

Global consumption of oil and oil products (mil. barrel / day)

	IEA		EIA		OPEC	
2023	101.71	→	100.88	↘	101.89	↘
2024			102.73	↗		

Production, total and spare capacity in OPEC countries (mil. barrel / day)

	Production		Total capacity		Spare capacity	
2023	28.27	↘	31.80	↘	3.53	↗
2024	29.19	↘	32.42	↗	3.24	↗

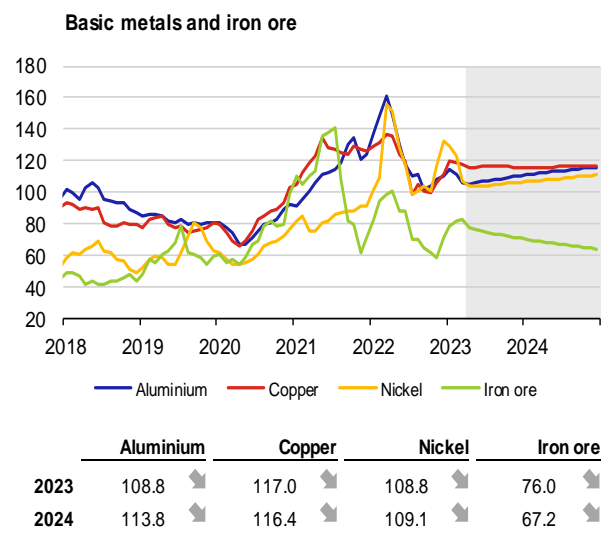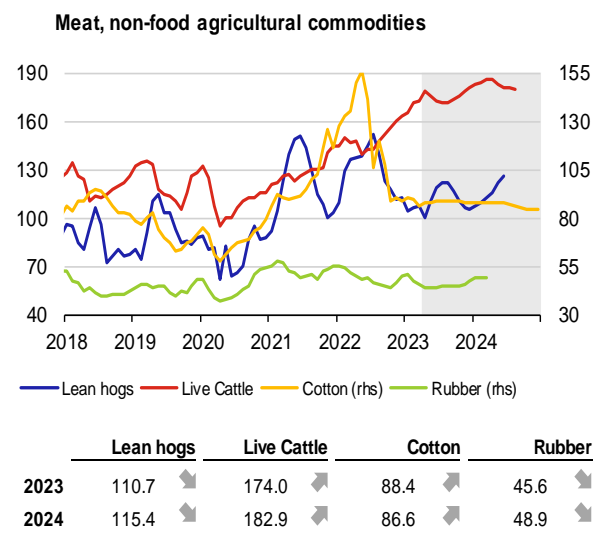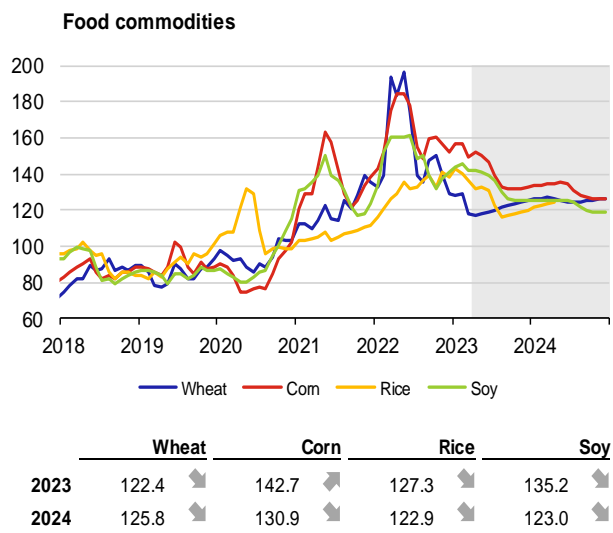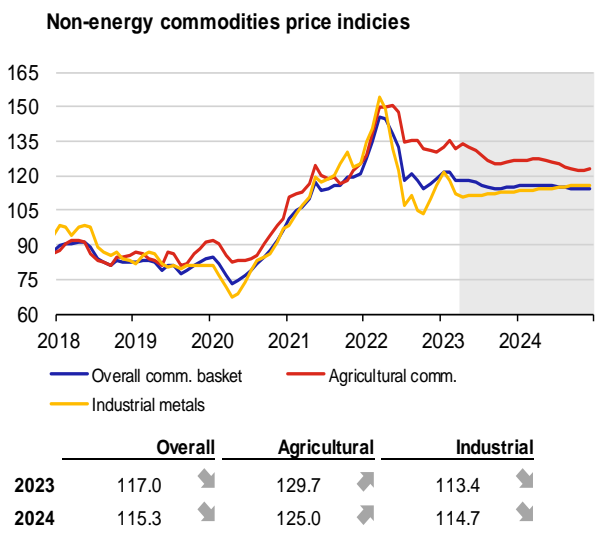Source: Bloomberg, IEA, EIA, OPEC, CNB calculation
Note: Oil price at ICE, average natural gas price in Europe – World Bank data. Future oil and gas prices (grey area) are derived from futures. Industrial oil stocks in OECD countries – IEA estimate. Production and extraction capacity of OPEC – EIA estimate.

IV.2 Other commodities

The price of natural gas in Europe (TTF) has been broadly flat since the start of March, at close to 40 EUR/MWh. As the end of the heating season approaches, storage facilities are fuller than usual (more than 55% of the total capacity at the end of March) and consumption remains limited (despite a slight increase for industrial use). Only France has a problem, since stocks have fallen below 30% due to strikes which have limited the operation of local LNG import terminals. Coal prices in Europe have been flat since February. Low demand from China and lower gas prices continue to drive coal prices down. Conversely, they should be supported by the gradual reduction of extraction in Australia (according to the newly adopted legislation, by 5% a year).

The food commodity price index has remained relatively high since last July. A bigger drop in prices is expected in the coming months owing to a favourable harvest outlook for key crops. There is still uncertainty around the export of grain from Ukraine, but the agreement allowing its export from Black Sea ports has been extended so far. In addition, Russia is trying to place part of its last year's record harvest on international markets. Only the price of sugar has seen a more marked increase since the end of March due to weaker production in India, Thailand and China, while the high production in Brazil will be partially used in ethanol production due to high oil prices. Cocoa and beef prices also increased, while pork prices fell.

The industrial metal price index fell in March and the first half of April owing to most of its components. Prices of most base metals continued to decline due to weak industrial activity in both China and the rest of the world. China's metal production is growing, but its consumption is still weak. Only the price of lead was flat as a result of solid demand due to the growth of electric car sales in the USA and Europe.

Non-energy commodities price indicies

	Overall		Agricultural		Industrial	
2023	117.0		129.7		113.4	
2024	115.3		125.0		114.7	

Food commodities

	Wheat		Corn		Rice		Soy	
2023	122.4		142.7		127.3		135.2	
2024	125.8		130.9		122.9		123.0	

Meat, non-food agricultural commodities

	Lean hogs		Live Cattle		Cotton		Rubber	
2023	110.7		174.0		88.4		45.6	
2024	115.4		182.9		86.6		48.9	

Basic metals and iron ore

	Aluminium		Copper		Nickel		Iron ore	
2023	108.8		117.0		108.8		76.0	
2024	113.8		116.4		109.1		67.2	

Source: Bloomberg, CNB calculations.
Note: Structure of non-energy commodity price indices corresponds to composition of The Economist commodity indices. Prices of individual commodities are expressed as indices 2010 = 100.

The inverted yield curve: economic recession on the horizon[1]

Something unusual has been happening on the US bond market since October 2022, something that is attracting a lot of interest and is sparking concerns among many economists and investors worldwide. Shorter maturity US government debt instruments generate higher returns than longer maturity government bonds. The yield curve for fixed-interest US government instruments has thus had a negative slope for several months, which is also rising over time. This phenomenon has reliably predicted all the economic recessions in the USA in the past more than 50 years. The current difference between the yield on 3-month US Treasury bills and the yield on 10-year US government bonds is now the highest since 1981. Can similar developments be expected again this time? This article sets out to identify the phases of the business cycle in the USA using the slope of the yield curve and the level of implied stock market volatility. It also attempts to estimate the timing of the next economic recession in the USA, which would have a major impact on the global economy as well.

The slope of the yield curve

The yield curve captures the relationship between interest income and bond maturity. The slope of the curve is determined by supply and demand for bonds. The supply-side agent in the case of US government debt instruments is the Department of the Treasury, which regularly announces auctions for such instruments. The instruments are broken down by maturity into 3- to 6-month Treasury bills and 2-, 5-, 10- and 30-year government bonds. On the demand side are a whole range of agents. Debt instruments with shorter maturities are purchased mainly by commercial banks and conservative retail investors. Instruments with longer maturities, i.e. bonds with a maturity of ten years or more, are bought mostly by foreign central banks, governments and insurance companies. The yield curve is normally upward sloping, with longer maturity debt instruments generating higher interest income than ones with an earlier maturity date. This phenomenon can be explained by the liquidity preference theory, according to which investors demand higher interest income (premium) on securities with longer maturities to reflect their higher risk. However, the opposite situation arises in some periods – often amid higher inflation and higher interest rates – when shorter maturity bond yields are higher than longer maturity ones. In such cases, when the yield curve is falling, we speak of an inverted yield curve.

An inverted yield curve and the investor behaviour that leads to such an unusual situation can be explained using the expectations hypothesis of the term structure of interest rates. This hypothesis says that the current yield curve slope is determined by expected future interest rates. If the market expects a future economic downturn, long-term interest rates fall and short-term interest rates can go above long-term ones. Investors' decision-making in an environment of uncertainty and elevated risk generally leads to capital being transferred from more risky assets (shares) to less risky ones (government bonds). As demand for bonds rises, bond prices increase and bond yields conversely fall. To some extent, the yield curve slope thus reflects market sentiment, which is forward-looking.

The slope of the yield curve is often mentioned in the literature in the context of the forecasting of phases of the business cycle. Studies on the relationship between the yield curve and recessions started to emerge in the 1980s in response to the inability of complex macroeconomic models to predict sudden falls in economic activity. The ability to predict phases of the business cycle using the yield curve slope was first mentioned in Laurent (1988) and Estrella and Hardouvelis (1991). Moreover, Harvey (1988) and Estrella and Hardouvelis (1991) state that differences in yields across yield curve maturities can also be used to forecast other economic variables (such as consumption and investment growth). Estrella and Mishkin (1998) mention that the yield differential has a strong predictive ability for predicting recessions one year ahead in the long run.

Internationally, however, the ability of the yield curve slope to predict future recessions has not been clearly confirmed (unlike in the case of the USA). Chinn and Kucko (2015) conclude that the yield differential has relatively good predictive power for forecasting recessions in the cases of Canada and Germany, but worse power for Japan and Italy. Michl (2018) also mentions the negative slope of the US yield curve as a warning sign of an approaching recession. Michl notes that the last seven recessions in the USA were preceded by an inverted yield curve. Brainard (2018) shows that a flat or inverted yield curve on the bond market can signal that short-term interest rates are too high relative to the current position of the economy in the cycle and may thus represent a risk of it being dragged into a recession. For example, However, Yellen (2019) takes the view that the negative slope of the US yield curve may be signalling only an economic slowdown, not necessarily an imminent recession. According to Yellen, the inverted yield curve may signal the need for the US central bank (the Fed) to cut its key interest rates. Moreover, Yellen believes that there has been a tendency for the yield curve to be very flat in recent years. A study by Rizzi and Mueller-Glissmann (2019) reaches a similar conclusion. They examined the proportion of the yield curve in the USA inverted since 1975 across all maturities. The arguments for why the current negative slope of the yield curve may not signal an imminent recession include, for example, those made by economists Korapaty and Marshal (2023) who mention in their study that a large proportion of the inversion reflects the past period of very low real interest rates, while the US economy is also now in better shape than in previous cycles. In their view, the current inversion of the yield curve will not last

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[1] Author: Martin Motl. The views expressed in this article are those of the author and do not necessarily reflect the official position of the Czech National Bank.

long, as high interest rates will gradually feed through to investor expectations, leading to an upward revision of long-term interest rates.

The difference between the yields on the 10-year US government bond and the 3-month Treasury bill is commonly used in the literature to illustrate the yield differential between long and short maturity instruments. Chart 1 captures this relationship from 1953 to the end of March 2023. It shows that past recessions (grey areas) have often been preceded by negative values of this difference, i.e. the 3-month T-bill yield was higher than the 10-year bond yield. This situation has occurred in the US economy only 10% of the time over the past 70 years and is thus a relatively isolated phenomenon. This situation arose again on 27 October 2022. Apart from three days at the start of November, this interest rate differential has been negative ever since, and its value continues to increase over time. The current level of the differential is around -126 basis points, while a lower value was last recorded on 19 June 1981 at -140 basis points.

Chart 1 – Difference between the yields on the 10-year US government bond and the 3-month Treasury bill
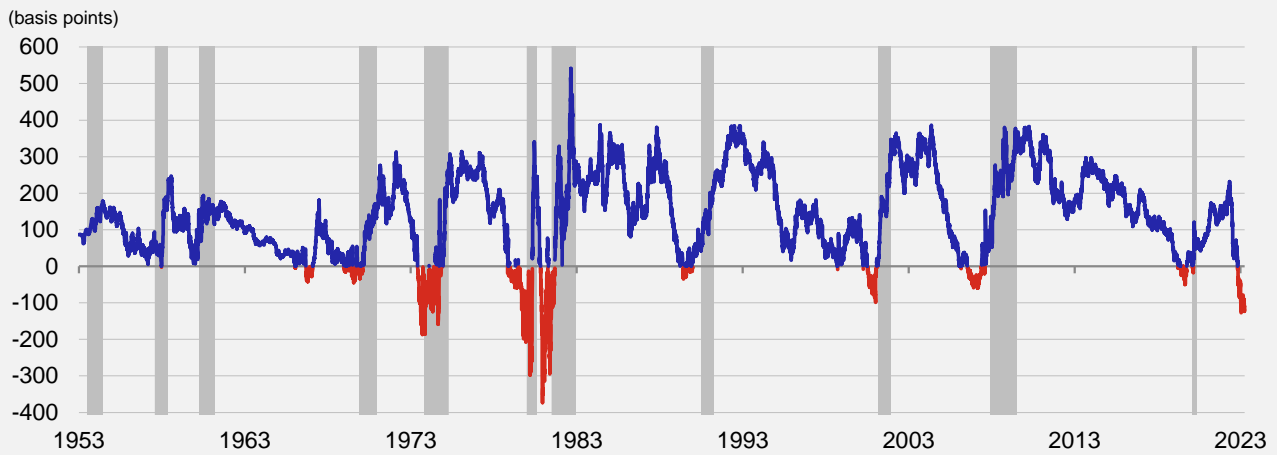
Source: Federal Reserve Bank of St. Louis (FRED Database), National Bureau of Economic Research (NBER), Bloomberg, CNB calculations.
Note: Daily data, the grey area defines the recession period of the US economy according to data from the National Bureau of Economic Research (NBER). The blue line denotes the period when the yield curve was rising, while the red line denotes the period when the difference between the 10-year and 3-month yields was negative, i.e. the yield curve was falling.

Chart 2 – The Fed's monetary policy interest rate and 3-month and 30-year US government bond yields

Source: National Bureau of Economic Research (NBER), Bloomberg.
Note: Daily data, the grey area defines the recession periods of the US economy according to data from the National Bureau of Economic Research (NBER).

### Implied stock market volatility

A significant inverse statistical relationship between future stock market volatility and the yield curve slope, which is strongly affected by Fed monetary policy, can be observed in the historical data. The Fed directly affects the short end of the yield curve by setting short-term nominal interest rates as its main instrument (see Chart 2). It also indirectly affects the yield curve at its longer end through market agents' inflation expectations, formed on their perceptions of the

central bank's actions.[2] A period of a steeply rising yield curve thus reflects accommodative Fed monetary policy (a falling short-term interest rate). In such periods, stock markets are optimistic, share prices are set for long-term growth and volatility is low. By contrast, periods of a very flat or inverted yield curve reflect tight monetary policy (a rising short-term interest rate), which negatively affects firms' profits, leading to a fall in share prices and growing stock market volatility.

Stock market volatility can be measured using the volatility index (VIX)[3], which is calculated in real time and represents the expected price volatility of the S&P 500 stock index over the next 30 days. In terms of technical construction, the VIX is unique in that it approximates the level of future stock market volatility based on the implied volatility derived from option prices. It thus does not measure the same type of volatility as most other indicators, which derive it solely from historical data. The VIX rises in times of expected greater uncertainty (and hence greater stock price volatility), while staying low in calm times. It thus represents an objective measure of perceived market risk and investor sentiment across all sectors of the economy and is therefore referred to as the "Fear Index".

There is an inverse relationship between the S&P 500 and the VIX most of the time. The VIX tends to rise when the stock market is falling. Conversely, implied volatility levels are stable or falling when stock prices are rising (see Chart 3). This is due to the construction of the VIX, which is derived from the implied volatility of option prices. The VIX goes up when demand for options on the market is strong, which usually happens during stock market corrections. To protect against risk, investors, who mostly hold long positions, buy put options to hedge their portfolios. By contrast, demand for put options goes down and the VIX falls when the stock market is rising.

Chart 3 – The VIX and the S&P 500 stock index
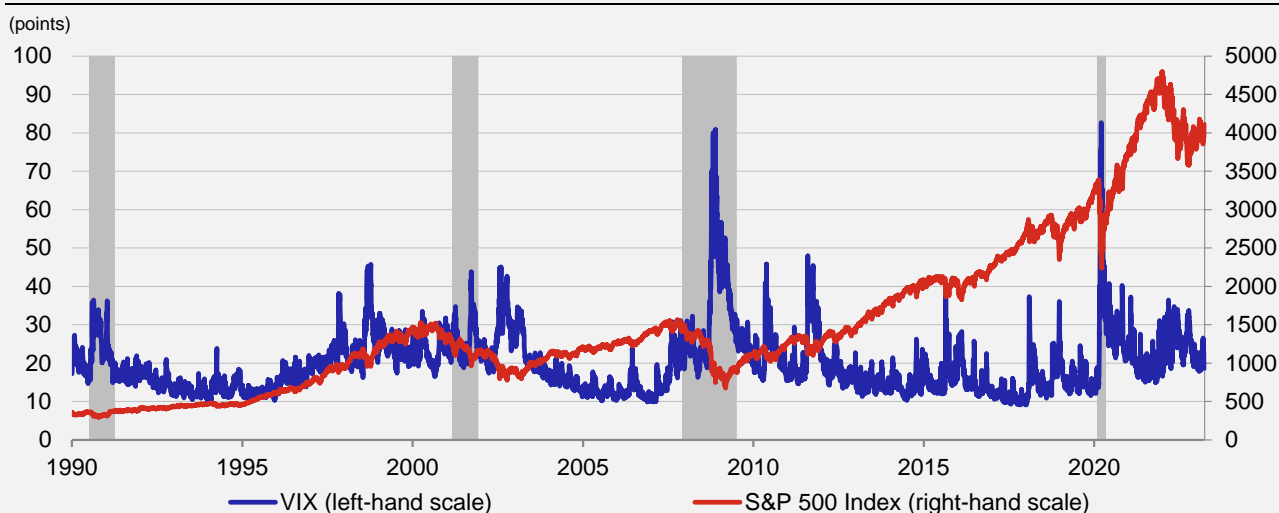
Source: National Bureau of Economic Research (NBER), Bloomberg.
Note: Daily data, the grey area defines the recession periods of the US economy according to data from the National Bureau of Economic Research (NBER).

Relationship between the yield curve slope and implied stock market volatility

The relationship between the yield curve slope and the volatility level on the US stock market (VIX) can be illustrated using a dot chart taking the rate of US economic growth into account. The x-axis shows the value of the VIX, which represents the level of investor perceived risk on the US stock market. A movement to the right along the x-axis means growth in volatility. The y-axis shows the difference between the yields on the 30-year US government bond and the 3-month Treasury bill. This difference between the two most distant maturities thus captures the behaviour of the yield curve as a whole. Growth in this difference (an upward movement along the y-axis) means that the long-term yields are rising relative to the short-term ones, and thus the yield curve is also rising more steeply. Conversely, a decrease in this difference represents growth in the short-term yield relative to the long-term one, which leads to a flattening of the yield curve (a downward movement along the y-axis). The third dimension of this chart is a colour map depicting quarter-on-quarter US real GDP growth for each observation on the x- and y-axes of the dot chart. As economic growth starts to rise from the low

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[2] Central bank credibility is another important factor affecting the longer end of the yield curve – see Smets and Tsatsaronis (1997).

[3] The VIX was unveiled in 1993 and initially only measured the implied volatility of at-the-money S&P 100 options. In 2003, however, the Chicago Board Options Exchange (CBOE) started to publish this index based on the broader S&P 500, which reflects the dynamics of the broader US stock market. It simultaneously changed the calculation method, which now includes out-of-the-money options, i.e. options at strike prices with a delta of less than 50, in addition to the implied volatility of at-the-money call and put options. As regards the time to expiration of the index component, the VIX only contains call and put options with more than 23 days and less than 37 days to expiration. Moreover, the time series since 1990 was consistently recalculated when the new calculation method was introduced.
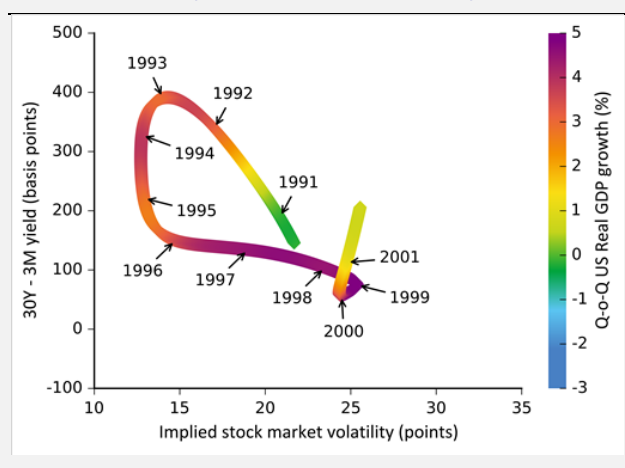
levels recorded during a recession, the dots in the chart gradually change colour from blue-green to orange-purple, which represents peak quarterly growth in economic activity.

The following dot charts show the course of the three most recent business cycles in the USA, including the current cycle. Daily data from October 1990 to the end of March 2023 were used to show the volatility levels and the yield curve slope. Due to the very high volatility of the daily data, particularly in the case of the VIX, which reflects day-to-day changes in investor sentiment, all the input time series were smoothed using the Hodrick-Prescott filter, as were the quarter-on-quarter US GDP growth data, which are available at quarterly frequency. The diagrams generated in this way, describing the relationship between the yield curve slope and the level of implied volatility on the stock market, at first glance form distinct, regularly repeating cycles going anticlockwise (see Charts 4–6). **This regularly repeating model of behaviour, reflecting the course of the business cycle, can be divided into four phases:**

- **Recession** – separates the end of the previous and start of the new business cycle, economic activity cools significantly, inflation pressures weaken and short-term interest rates decrease, the slope of the yield curve rises steeply amid high – and further increasing – stock market volatility. This causes the curve in the diagram to shift upwards to the right.
- **Early growth phase** – economic growth starts to pick up amid a gradual rise in inflation and stable short-term interest rates, the slope of the yield curve rises and stock market volatility starts to fall sharply (the curve in the diagram shifts upwards to the left).
- **Advanced growth phase** – inflation accelerates and short-term interest rates rise amid solid economic growth, the slope of the yield curve starts to flatten rapidly and stock market volatility is low, which reflects the downward shift of the curve of the diagram.
- **Late growth phase** – the rate of economic growth is already close to its peak, both inflation and interest rates are high, the slope of the yield curve is zero or even negative and stock market volatility rises on concerns of a slowdown in economic growth and an approaching recession; at the same time, investments are being moved into less risky assets, causing the stock market to correct from its highs (a downward right shift of the curve in the diagram).

The first cycle describes the period from October 1990 to July 2001, which ended with the bursting of the dotcom tech bubble (see Chart 4). The 1990s went down in the history of the US economy as a time of strong economic growth, steady job creation, low inflation, rising productivity and a surging stock market. This was also fostered by a substantial easing of Fed monetary policy. It cut its key interest rate significantly from 8.25% to 3% at the start of the 1990s, resulting in a steep rise in the yield curve until the end of 1992. The Fed later started to tighten its monetary policy, which led to a rapid flattening of the slope of the yield curve in 1993–1996. The US economy also proved resilient to negative external shocks in the second half of the 1990s, when several financial crises occurred around the world.[4] The increasing risk in the global economy was reflected on the US stock market in the form of several minor corrections and a sharp rise in volatility amid only a slight flattening of the yield curve. At the end of the 1990s, the US stock market experienced a surge in

Chart 4 – First cycle: October 1990 – July 2001

Source: Bloomberg, CNB calculations.
Note: Time series were smoothed using the Hodrick-Prescott filter.

technology stock prices, even though tech firms' revenues were rising at a much slower rate. Fed monetary policy tightened rapidly between June 1999 and May 2000, when the short-term interest rate rose from 4.75% to 6.50%. The "bursting" of the bubble and a significant stock market correction subsequently triggered a recession and unemployment growth. A subsequent sharp reduction in interest rates amid high stock market volatility resulted in a rapid rise in the slope of the yield curve – see the upward vertical shift on the y-axis in the chart.

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[4] Mexico (1995), Asia (1997), Russia (1998) and Argentina (1999).

The second cycle, describing the period from August 2001 to September 2008, ended for a change with a property bubble burst (see Chart 5). This time, the recession was caused mainly by extreme price growth on the property market during the advanced growth phase in 2003–2005. It was also partly due to insufficient banking regulation and supervision and to the extremely accommodative monetary policy of the Fed,[5] which cut its key interest rate from 6.5% to just 1% in 2001–2003. In mid-2004, the Fed started to tighten its monetary policy significantly, to 5.25% in mid-2006. This caused the yield curve to flatten rapidly – its slope turned negative that year for the first time since the previous recession in 2001. Property prices thus stopped rising and in 2007 started to fall. This also led to very fast growth in stock market volatility. In October 2007, the Fed started to rapidly reduce interest rates again, which was also reflected in the rapid rise in the slope of the yield curve – see the upward shift to the right in the chart. The subsequent panic peaked in September 2008 with the fall of the fourth largest US

Chart 5 – Second cycle: August 2001 – September 2008

Source: Bloomberg, CNB calculations.
Note: Time series were smoothed using the Hodrick-Prescott filter.

investment bank – Lehman Brothers. The bank thus became the first victim of the mortgage crisis, which ended in an extremely deep global economic recession.

The third and last cycle, which is still ongoing,[6] describes the period from October 2008 to the end of March 2023 (see Chart 6). The current cycle, which started with economic recovery in mid-2009, can be described as the longest business cycle in more than 200 years. A slow rate of economic growth in the recovery phase, in a situation where interest rates had reached the zero lower bound in December 2008, led the US central bank to deploy unconventional monetary policy in the form an asset purchase programme known as quantitative easing (QE). The three rounds of QE, lasting until the end of 2014 – which led to an increase in the Fed's balance-sheet total from USD 900 billion to almost USD 4,500 billion – ultimately led mainly to a rise in bond prices and a drop in borrowing costs, and also to stock price growth and a fall in

stock market volatility, rather than to accelerating growth and inflation. The Fed's purchases of longer maturity bonds resulted in some distortion of the yield curve. The administratively created demand artificially depressed yields at the long end of the yield curve. With the Fed's short-term nominal rates stable at the zero lower bound, this led to a flattening of the yield curve.[7] These measures thus extended the period of accommodative monetary policy, also contributing in large measure to the extension of the business cycle. The Fed made the first increase in its key interest rate in the post-crisis period in December 2015 and continued to tighten monetary policy gradually until December 2018 when the key interest rate reached 2.50%. The tightening of monetary policy by the Fed in that period amid a cooling of the pace of economic growth was accompanied by a flattening of the yield curve. In March 2019, the slope of the yield curve finally turned negative again for the first time since August 2007 for only 5 days. The yield curve was subsequently inverted from May to the
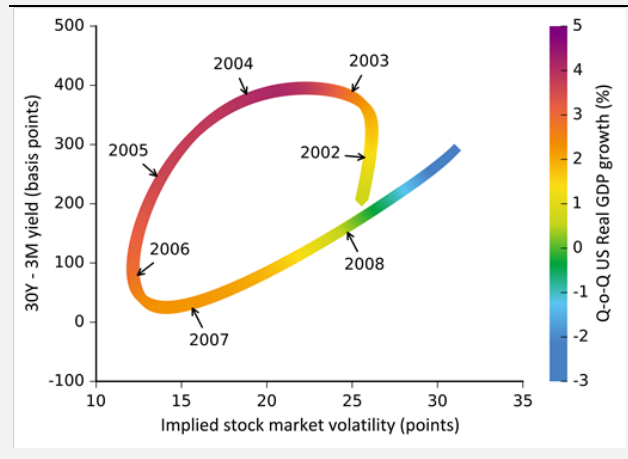
Chart 6 – Third cycle: October 2008 – still ongoing
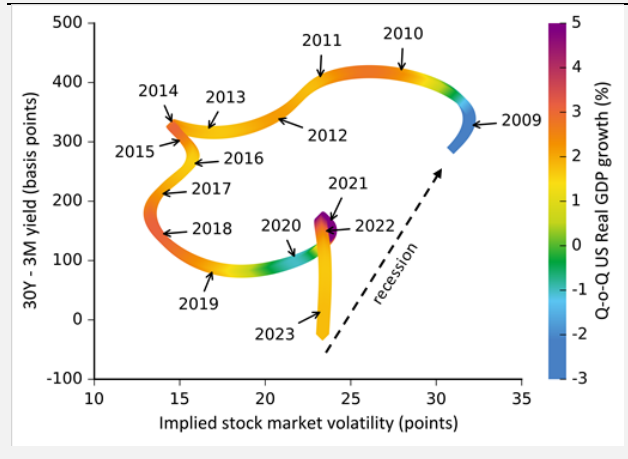
Source: Bloomberg, CNB calculations.
Note: Time series were smoothed using the Hodrick-Prescott filter.

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[5] See Taylor (2009).

[6] According to the indicators of economic activity used, the National Bureau of Economic Research (NBER) officially identified a recession in the USA in the first half of 2020. However, compared to a standard demand crisis, like the one in 2009, the nature of the Covid-19 pandemic shock was as such that many economic agents would like to continue to consume or produce, but were prevented from doing so by the pandemic situation and anti-epidemic measures. This is apparent from the subsequent very rapid recovery in economic activity and sentiment reflecting a very strong demand after shutdowns were lifted, which was also confirmed by the estimate of households' saving rates, which soared to a record high in 2020 Q2. In this context and based on the movement of the circular diagram, which signals a continuation of the cycle, this analysis perceives the Covid-19 pandemic as only a short-term fluctuation of a non-fundamental nature within the current cycle.

[7] Bonis, Ihrig and Wei (2017), for example, estimate that the three consecutive QE programmes in 2008–2014 resulted in a flattening of the longer end of the yield curve of up to 100 basis points.

start of October 2019. As depicted in the diagram, at that time the cycle was already in the late growth phase where, in addition to the inversion of the yield curve, implied stock market volatility was also growing and the economy was already heading into a recession phase. Meanwhile, the Fed started a cycle of gradual monetary policy easing again in summer 2019 in an effort to support the economy, when it cut interest rates to 1.75% in October 2019. It kept them at this level until early March 2020, when the world had already been hit hard by the Covid-19 pandemic. Central banks worldwide responded by sharply easing monetary policy to mitigate an economic disaster. In the case of the Fed, this meant an unprecedented sharp reduction in interest rates in the first half of March by 50 and 100 basis points to the zero lower bound to a range of 0% to 0.25%. At the same time, the Fed resumed quantitative easing on a massive scale and introduced a wide range of other support measures, which resulted in its balance sheet growing by 70% to more than USD 7000 billion in the first half of 2020 alone. Interest rates were left at zero until March 2022. Long before that – after the initial panic and a certain lack of experience with a natural disaster of this nature (pandemic) had subsided – it was clear that the extent of monetary policy easing, which corresponded more to a demand crisis, was inadequate. The significant, albeit short-term, recession in 2020 was due mainly to a decrease in potential (supply) and, just like any other natural disaster, had adverse stagflationary supply-side effects overall.[8] However, most central banks around the world misinterpreted monetary policy error which, among other things, resulted in a rise in significant inflation pressures to which the Fed responded with a lag, but all the more aggressively by sharply increasing interest rates by 500 basis points in just 12 months to March 2023.[9] This also resulted in a significant inversion of the yield curve amid a broadly stable albeit increased level of implied stock market volatility, see the downward vertical shift of the curve of the diagram.

From the perspective of the circular diagram, which takes into account the bond and stock market situation, the current position of the US economy corresponds to the late growth phase of the cycle. In the past, this phase was observed in 1997–1999, 2006–2007, but also recently in 2018–2019 when a recession caused by a natural disaster of a supply nature prevented the natural completion of the business cycle. Therefore, it was not a standard crisis of a demand nature, where the drop in economic activity are due to factors inside the economic system in the form of a sudden market response to accumulated market imbalances. This thus led to the postponement of the end of the business cycle in the usual way. According to the circular diagram, the yield curve has now reached even greater extremes of inversion than before 2020. Moreover, in a situation of rapidly rising interest rates, a higher accumulation of global imbalances, including greater debt at all levels, may subsequently cause an even deeper economic recession. The significant tightening of monetary policies is already starting to negatively affect the financial sector and has partly contributed to the collapse of several regional banks in the USA and to the problems and subsequent forced takeover of Credit Suisse in Europe.

The next phase of the current cycle is the recession phase, the likelihood of which seems very high – based on historical experience it is already less than 24 months away. This potential future continuation of the current cycle is shown as a black dotted line in Chart 6. This assumes a further possible moderate increase in Fed interest rates above the current 5% level, with interest rate stability expected to follow. However, also given the stable short end of the yield curve, its negative slope is likely to rise further. The could be due to a decline in inflation expectations, reflecting the expected economic slowdown, which will lead to a drop in yields at the longer end of the yield curve through increased demand for less risky assets (longer maturity bonds). Stock market volatility could rise further due to a shift in the behaviour of investors, who will increasingly hedge against a stock market correction (by buying put options increasing implied volatility) in expectation of a worse economic outlook. The big unknown is always which factor could trigger a possible crisis this time. However, the inverted yield curve is a relatively clear signal from the market that a recession may not be far off. Its emergence, though, depends on how fast the combination of high interest rates and an inverted yield curve, along with stock market correction, will tighten the credit channel in some sectors of the economy. Persistent inflation anchored at high levels for a long time, whose compression to the inflation target would require additional significant tightening of monetary conditions, is currently a major risk – as we have also learned from a similar experience of the US economy in the early 1980s. In response to the resulting economic downturn and inflation pressures, the Fed would later start to rapidly ease monetary policy for a certain period of time. A potential drop in interest rates would thus, ceteris paribus, push the short end of the yield curve down faster relative to the longer end and the slope of the yield curve would start to rise steeply again. In this situation, the level of implied volatility would also increase on the US stock market, depending on the extent to which stock market investors would fear a future recession and on the expected depth of the stock market correction. This would cause the curve of the diagram to shift upwards to the right, thus definitively closing the circle of the current longest cycle in modern history.

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[8] See Brůha, Motl and Tonner (2021) who, based on an empirical comparison of the Covid-19 pandemic-induced crisis with the global financial and economic crisis and model simulations, demonstrated that the sharp economic downturn observed in 2020 bore, for the most part, the hallmarks of a supply shock. In this context, they pointed out that any misinterpretation of the impacts of the Covid-19 pandemic as having exclusively negative demand effects would lead to a more significant overshooting of central banks' inflation targets if they continued to maintain excessively accommodative monetary policy.

[9] In addition, the surge in inflation from the second half of 2021 has led to a sharp and synchronised tightening of monetary conditions across the global economy, see Benecká, Kábrt, Komárek and Polák (2023).

Conclusion

The use of the yield curve to predict future economic recessions could be a relatively simple and suitable addition to standard and complex macroeconomic modelling. Information from the government bond and stock markets, which are essentially forward-looking, can be used quite reliably to predict sudden events such as recessions, which are generally very hard to predict.

An inverted yield curve may signal the risk of a recession occurring in the next 12 to 24 months, as has been the case with all economic recessions over the last more than 50 years. However, there have also been periods in the distant past when the yield curve has flattened significantly or become inverted without signalling an imminent recession. These periods were generally characterised by low yields and a flat yield curve. Such a pattern in the current cycle is supported, on the one hand, by until recently long-standing low short-term interest rates, which have been below their long-term equilibrium levels for several years now, and, on the other hand, by the impacts of quantitative easing, which have lowered the longer end of the yield curve. In such an environment, the yield curve could easily invert without necessarily signalling an approaching recession, as was the case in mid-1960s.

Despite some differences, however, similar trends to those in previous cycles have been identified in the current one. As shown by data on the difference between the yields on 30-year bonds and 3-month T-bills in conjunction with the implied volatility of S&P 500 options, the US economy can be quite clearly identified as being in a late growth phase of the business cycle using this relationship. This phase is characterised by a tightening of Fed monetary policy, reflected in a relatively steep rise in short-term yields relative to long-term ones. This is resulting in the current relatively extreme inversion of the yield curve, whose negative slope is reaching its highest level in more than 40 years. The pace of economic growth has gradually slowed from its peak, while a deeper stock market correction has been underway for more than a year now amid a permanently increased level of implied volatility compared to the historical average.

Taking the identified current phase of the cycle into account, our analysis of previous economic cycles in the USA suggests that the risk of an economic recession occurring in less than 24 months is very high.

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Keywords

yield curve, monetary policy, bond market, stock market, business cycle

JEL Classification

B22, B26, D53, E52

A1. Change in predictions for 2023

GDP growth, %

	CF		IMF		OECD		CB / OE	
EA	+0.1	2023/4 2023/3	+0.1	2023/4 2023/1	+0.3	2023/3 2022/11	+0.5	2023/3 2022/12
US	+0.1	2023/4 2023/3	+0.2	2023/4 2023/1	+1.0	2023/3 2022/11	-0.1	2023/3 2022/12
UK	+0.3	2023/4 2023/3	+0.3	2023/4 2023/1	+0.2	2023/3 2022/11	+1.0	2023/2 2022/11
JP	+0.1	2023/4 2023/3	-0.5	2023/4 2023/1	-0.4	2023/3 2022/11	-0.2	2023/1 2022/10
CN	+0.2	2023/4 2023/3	0	2023/4 2023/1	+0.7	2023/3 2022/11	+0.5	2023/4 2023/3
RU	+0.7	2023/3 2023/2	+0.4	2023/4 2023/1	+3.1	2023/3 2022/11	+0.4	2023/4 2023/3

Inflation, %

	CF		IMF		OECD		CB / OE	
EA	-0.1	2023/4 2023/3	-0.4	2023/4 2022/10	-0.6	2023/3 2022/11	-1.0	2023/3 2022/12
US	+0.1	2023/4 2023/3	+1.0	2023/4 2022/10	-0.2	2023/3 2022/11	+0.2	2023/3 2022/12
UK	0	2023/4 2023/3	-2.2	2023/4 2022/10	+0.1	2023/3 2022/11	-1.3	2023/2 2022/11
JP	+0.2	2023/4 2023/3	+1.3	2023/4 2022/10	+0.5	2023/3 2022/11	0	2023/1 2022/10
CN	-0.1	2023/4 2023/3	-0.2	2023/4 2022/10	0	2023/3 2022/11	0	2023/4 2023/3
RU	-0.1	2023/3 2023/2	+2.0	2023/4 2022/10	-0.3	2023/3 2022/11	-0.4	2023/4 2023/3

A2. Change in predictions for 2024

GDP growth, %

	CF		IMF		OECD		CB / OE	
EA	-0.1	2023/4 2023/3	-0.2	2023/4 2023/1	+0.1	2023/3 2022/11	-0.3	2023/3 2022/12
US	-0.2	2023/4 2023/3	+0.1	2023/4 2023/1	-0.1	2023/3 2022/11	-0.4	2023/3 2022/12
UK	+0.1	2023/4 2023/3	+0.1	2023/4 2023/1	+0.7	2023/3 2022/11	+0.7	2023/2 2022/11
JP	0	2023/4 2023/3	+0.1	2023/4 2023/1	+0.2	2023/3 2022/11	-0.4	2023/1 2022/10
CN	-0.1	2023/4 2023/3	0	2023/4 2023/1	+0.8	2023/3 2022/11	-0.4	2023/4 2023/3
RU	0	2023/3 2023/2	-0.8	2023/4 2023/1	-0.3	2023/3 2022/11	0	2023/4 2023/3

Inflation, %

	CF		IMF		OECD		CB / OE	
EA	0	2023/4 2023/3	+0.2	2023/4 2022/10	-0.4	2023/3 2022/11	-0.5	2023/3 2022/12
US	0	2023/4 2023/3	+0.1	2023/4 2022/10	-0.1	2023/3 2022/11	0	2023/3 2022/12
UK	-0.1	2023/4 2023/3	-0.7	2023/4 2022/10	-0.5	2023/3 2022/11	0	2023/2 2022/11
JP	+0.1	2023/4 2023/3	+1.2	2023/4 2022/10	+0.1	2023/3 2022/11	+0.2	2023/1 2022/10
CN	0	2023/4 2023/3	+0.3	2023/4 2022/10	0	2023/3 2022/11	0	2023/4 2023/3
RU	-0.1	2023/3 2023/2	+0.6	2023/4 2022/10	-0.8	2023/3 2022/11	-0.1	2023/4 2023/3

A3. GDP growth and inflation outlooks in the euro area countries

GDP growth in the euro area countries in 2023 and 2024, %
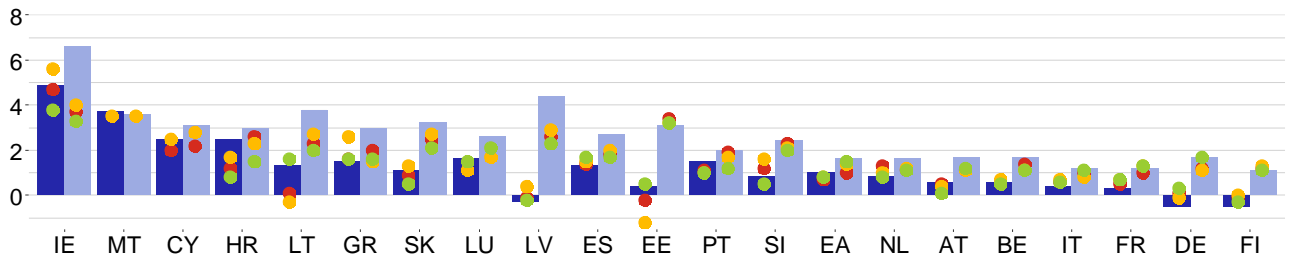
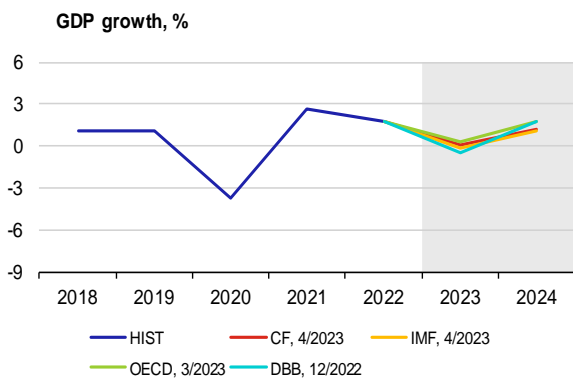Inflation in the euro area countries in 2023 and 2024, %
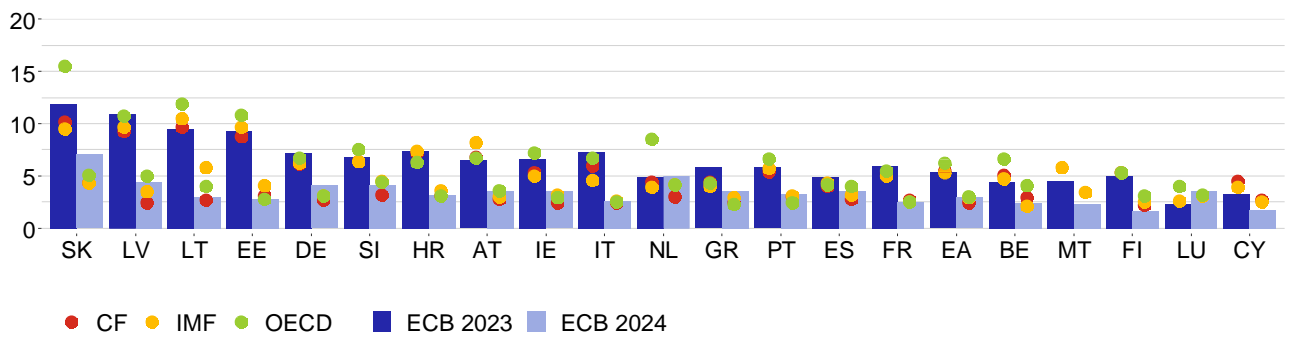
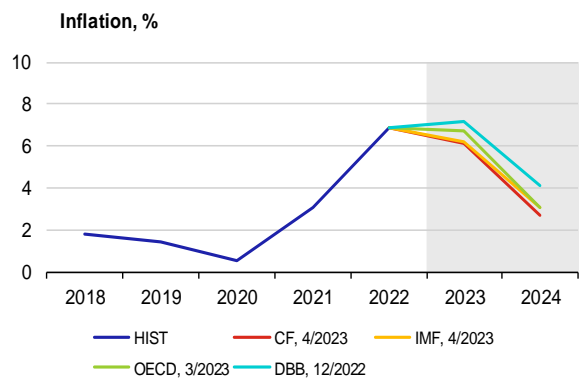● CF   ● IMF   ● OECD   ■ ECB 2023   ■ ECB 2024

Note: Charts show institutions' latest available outlooks of for the given country.

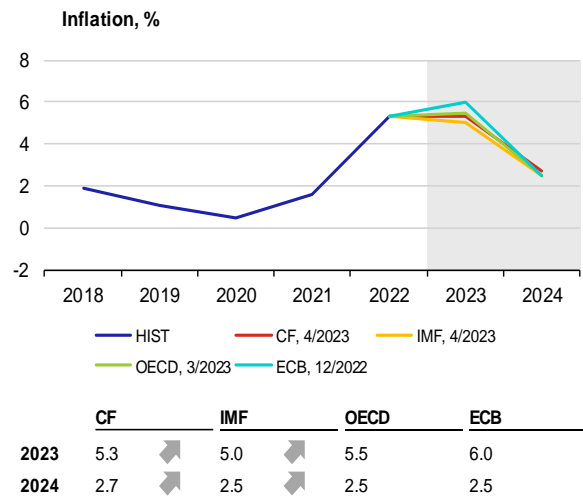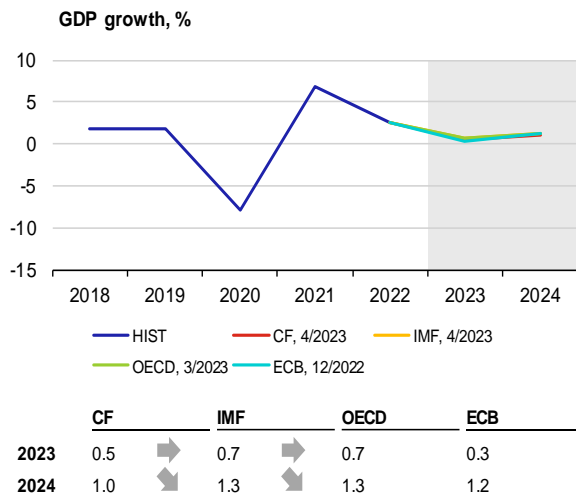## A4. GDP growth and inflation in the individual euro area countries

Germany

GDP growth, %

Inflation, %

—— HIST   —— CF, 4/2023   —— IMF, 4/2023
—— OECD, 3/2023   —— DBB, 12/2022

—— HIST   —— CF, 4/2023   —— IMF, 4/2023
—— OECD, 3/2023   —— DBB, 12/2022

	CF		IMF		OECD	DBB
2023	0.1	↗	-0.1	↘	0.3	-0.5
2024	1.2	↘	1.1	↘	1.7	1.7

	CF		IMF		OECD	DBB
2023	6.1	↗	6.2	↘	6.7	7.2
2024	2.7	→	3.1	↘	3.1	4.1

France

GDP growth, %

	CF		IMF		OECD	ECB
2023	0.5	→	0.7	→	0.7	0.3
2024	1.0	↘	1.3	↙	1.3	1.2

Inflation, %

	CF		IMF		OECD	ECB
2023	5.3	↗	5.0	↗	5.5	6.0
2024	2.7	↗	2.5	↗	2.5	2.5

Italy

GDP growth, %

	CF		IMF		OECD	ECB
2023	0.6	→	0.7	↗	0.6	0.4
2024	1.0	→	0.8	↙	1.1	1.2

Inflation, %

	CF		IMF		OECD	ECB
2023	6.0	↘	4.6	↘	6.7	7.3
2024	2.4	→	2.6	↗	2.5	2.6

Spain

GDP growth, %

	CF		IMF		OECD	ECB
2023	1.4	↗	1.5	↗	1.7	1.3
2024	1.8	→	2.0	↙	1.7	2.7

Inflation, %

	CF		IMF		OECD	ECB
2023	4.0	↗	4.3	↘	4.2	4.9
2024	2.8	↗	3.2	↘	4.0	3.6

Netherlands

GDP growth, %

Inflation, %

	CF		IMF		OECD	ECB
2023	1.3	↗	1.0	↗	0.8	0.8
2024	1.1	↘	1.2	↘	1.1	1.6

	CF		IMF		OECD	ECB
2023	4.4	↘	3.9	↘	8.5	4.9
2024	3.0	↘	4.2	↗	4.2	5.0

Belgium

GDP growth, %

Inflation, %

	CF		IMF		OECD	ECB
2023	0.5	↗	0.7	↗	0.5	0.6
2024	1.4	↘	1.1	↘	1.1	1.7

	CF		IMF		OECD	ECB
2023	5.1	↘	4.7	↘	6.6	4.4
2024	2.9	↗	2.1	↗	4.1	2.4

Austria

GDP growth, %

Inflation, %

	CF		IMF		OECD	ECB
2023	0.5	↗	0.4	↗	0.1	0.6
2024	1.1	↘	1.1	↘	1.2	1.7

	CF		IMF		OECD	ECB
2023	6.8	↗	8.2	↗	6.7	6.5
2024	2.8	↘	3.0	↗	3.6	3.6

Ireland

GDP growth, %

Inflation, %

	CF		IMF		OECD	ECB
2023	4.7	↗	5.6	↗	3.8	4.9
2024	3.7	→	4.0	→	3.3	6.6

	CF		IMF		OECD	ECB
2023	5.3	↘	5.0	↘	7.2	6.6
2024	2.4	↘	3.2	↗	2.9	3.5

Finland

GDP growth, %

Inflation, %

	CF		IMF		OECD	ECB
2023	-0.1	↘	0.0	↘	-0.3	-0.5
2024	1.2	→	1.3	↗	1.1	1.1

	CF		IMF		OECD	ECB
2023	5.3	↗	5.3	↗	5.3	5.0
2024	2.2	→	2.5	↗	3.1	1.6

Portugal

GDP growth, %

Inflation, %

	CF		IMF		OECD	ECB
2023	1.1	↗	1.0	↗	1.0	1.5
2024	1.9	→	1.7	↘	1.2	2.0

	CF		IMF		OECD	ECB
2023	5.4	↗	5.7	↗	6.6	5.8
2024	3.0	↗	3.1	↗	2.4	3.3

Greece

GDP growth, %

Inflation, %

	CF		IMF		OECD	ECB
2023	1.6	↗	2.6	↗	1.6	1.5
2024	2.0	↘	1.5	↙	1.6	3.0
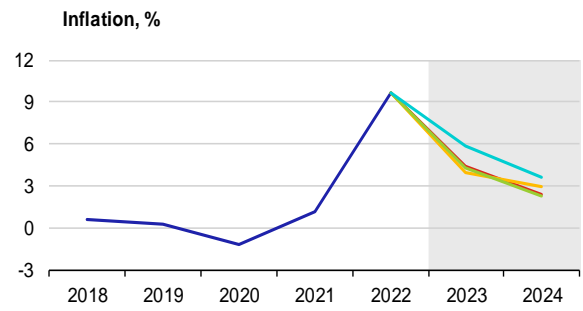
	CF		IMF		OECD	ECB
2023	4.4	↘	4.0	↗	4.3	5.8
2024	2.4	↗	2.9	↗	2.3	3.6

Slovakia

GDP growth, %

Inflation, %
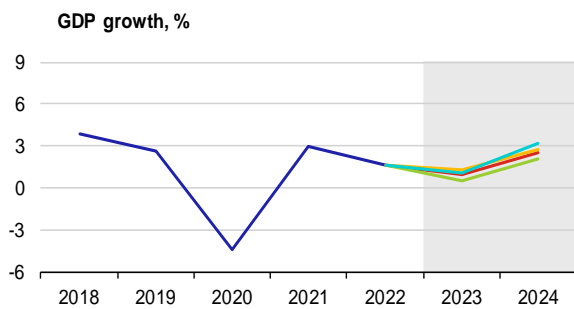
	CF		IMF		OECD	ECB
2023	0.9	↗	1.3	↗	0.5	1.1
2024	2.5	↘	2.7	↘	2.1	3.2
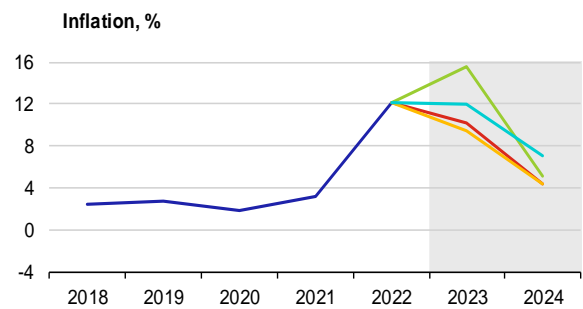
	CF		IMF		OECD	ECB
2023	10.2	↗	9.5	↘	15.5	11.9
2024	4.3	↘	4.3	↘	5.1	7.0

Luxembourg

GDP growth, %

Inflation, %
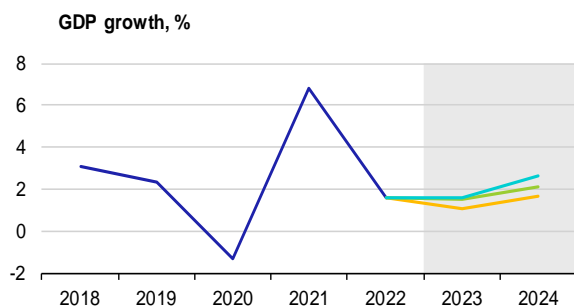
	CF	IMF		OECD	ECB
2023	n. a.	1.1	→	1.5	1.6
2024	n. a.	1.7	↘	2.1	2.6
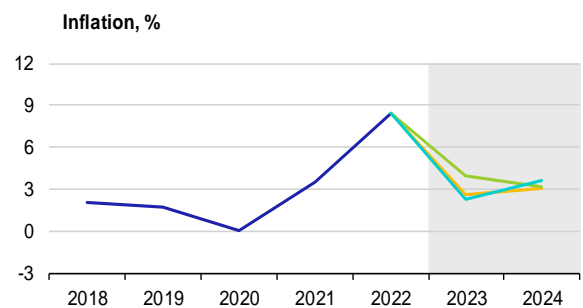
	CF	IMF		OECD	ECB
2023	n. a.	2.6	↘	4.0	2.3
2024	n. a.	3.1	↗	3.2	3.6

Slovenia

GDP growth, %
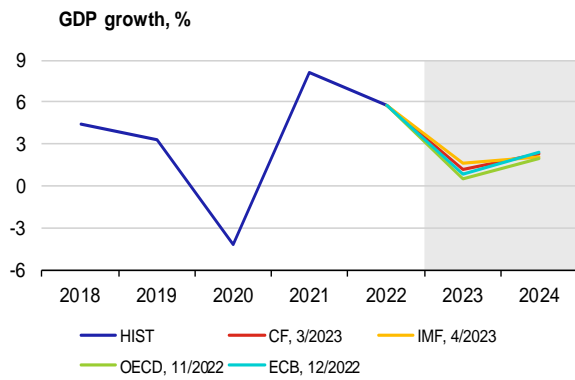
	CF		IMF		OECD	ECB
2023	1.2	→	1.6	↘	0.5	0.8
2024	2.3	↘	2.1	↘	2.0	2.4

Inflation, %
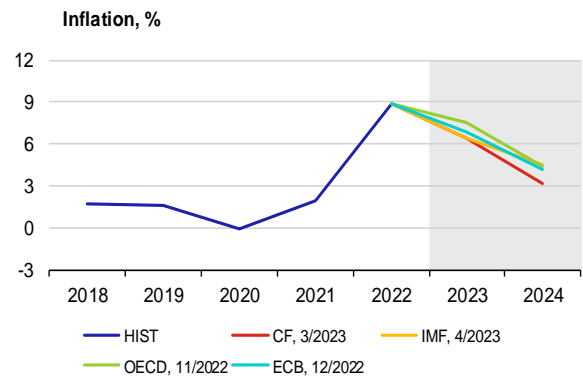
	CF		IMF		OECD	ECB
2023	6.4	↗	6.4	↗	7.5	6.8
2024	3.2	↘	4.5	↗	4.4	4.2

Lithuania

GDP growth, %
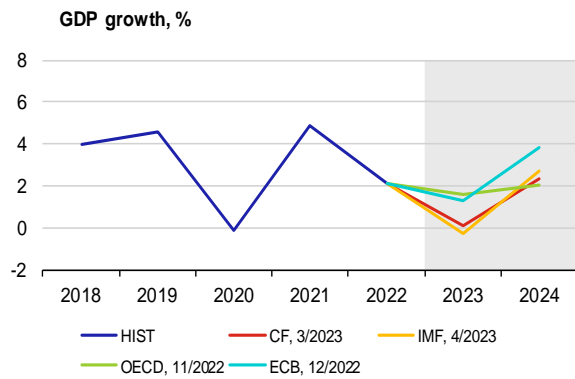
	CF		IMF		OECD	ECB
2023	0.1	↘	-0.3	↘	1.6	1.3
2024	2.3	↘	2.7	↘	2.0	3.8

Inflation, %
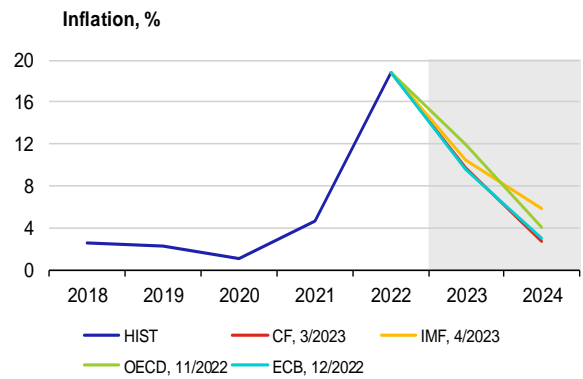
	CF		IMF		OECD	ECB
2023	9.7	→	10.5	↗	11.9	9.5
2024	2.7	→	5.8	↗	4.0	3.0

Latvia

GDP growth, %
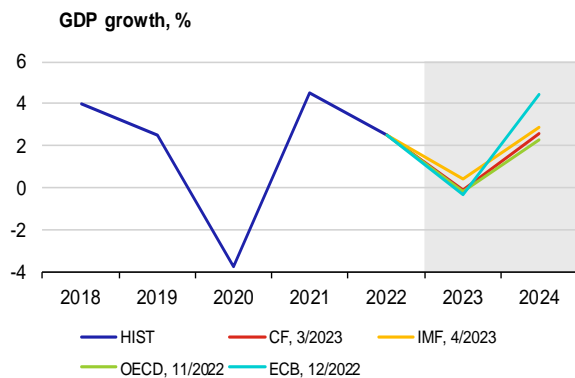
	CF		IMF		OECD	ECB
2023	-0.1	↗	0.4	↘	-0.2	-0.3
2024	2.6	↘	2.9	↘	2.3	4.4

Inflation, %
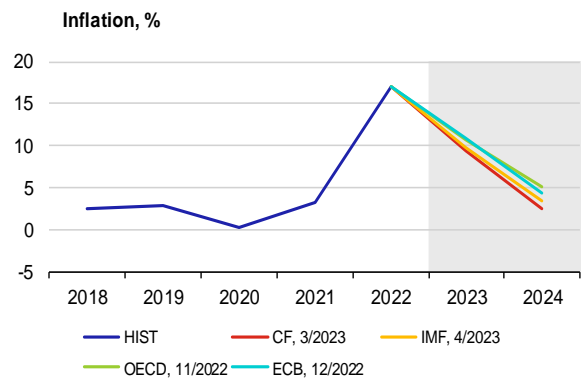
	CF		IMF		OECD	ECB
2023	9.3	↗	9.7	↗	10.7	10.9
2024	2.4	↘	3.5	↗	5.0	4.4

Estonia

GDP growth, %

- HIST
- CF, 3/2023
- IMF, 4/2023
- OECD, 11/2022
- ECB, 12/2022
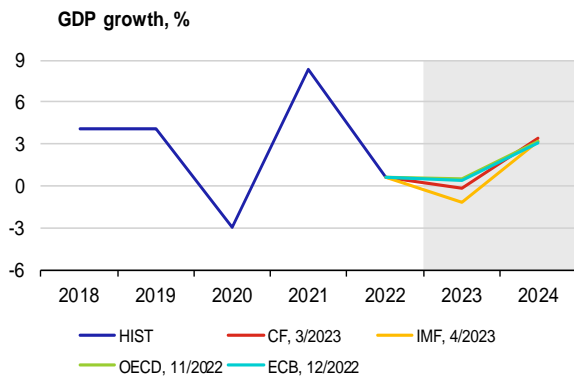
	CF		IMF		OECD	ECB
2023	-0.2	↘	-1.2	↗	0.5	0.4
2024	3.4	↗	3.2	↘	3.2	3.1

Inflation, %

- HIST
- CF, 3/2023
- IMF, 4/2023
- OECD, 11/2022
- ECB, 12/2022
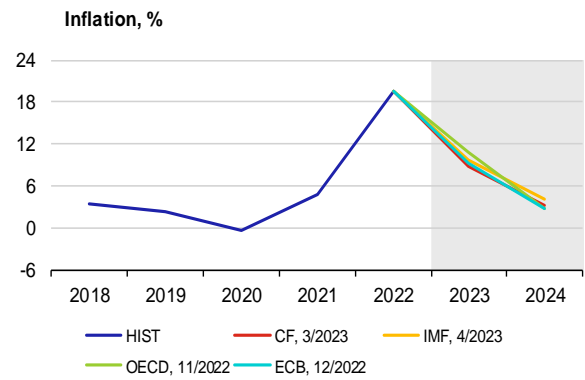
	CF		IMF		OECD	ECB
2023	8.8	→	9.7	↗	10.8	9.3
2024	3.1	→	4.1	↗	2.8	2.8

Cyprus

GDP growth, %

- HIST
- CF, 3/2023
- IMF, 4/2023
- OECD
- ECB, 12/2022
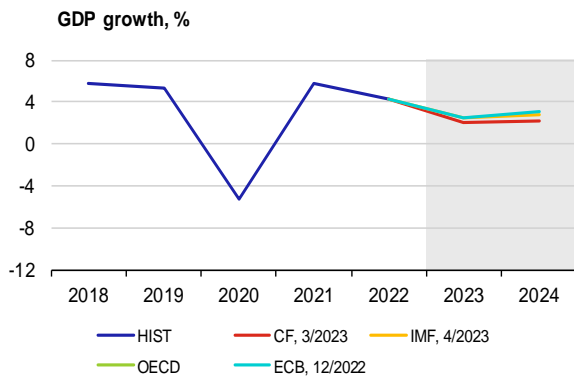
	CF		IMF		OECD	ECB
2023	2.0	↗	2.5	→	n. a.	2.5
2024	2.2	↘	2.8	↗	n. a.	3.1

Inflation, %

- HIST
- CF, 3/2023
- IMF, 4/2023
- OECD
- ECB, 12/2022
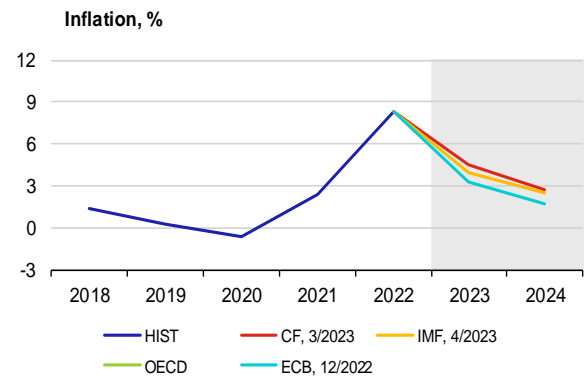
	CF		IMF		OECD	ECB
2023	4.5	↗	3.9	↗	n. a.	3.3
2024	2.7	↗	2.5	↗	n. a.	1.7

Malta

GDP growth, %

- HIST
- CF
- IMF, 4/2023
- OECD
- ECB, 12/2022
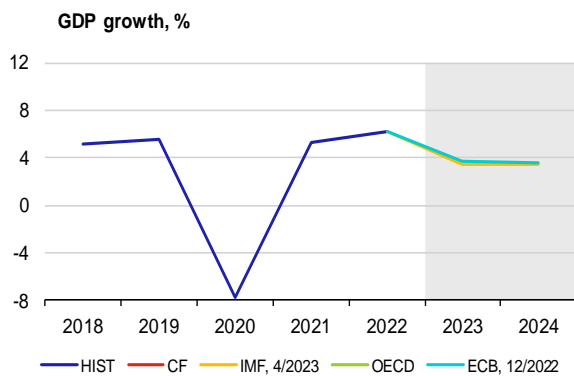
	CF	IMF		OECD	ECB
2023	n. a.	3.5	↗	n. a.	3.7
2024	n. a.	3.5	↘	n. a.	3.6

Inflation, %

- HIST
- CF
- IMF, 4/2023
- OECD
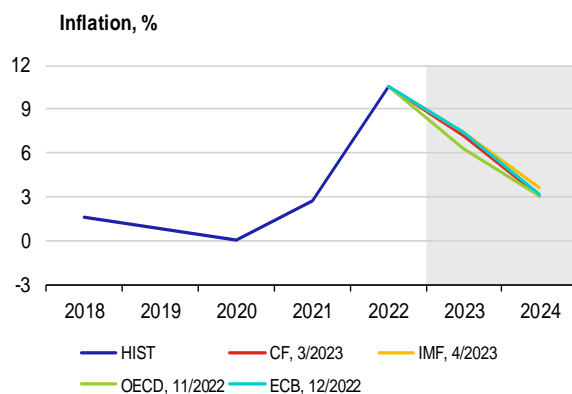- ECB, 12/2022
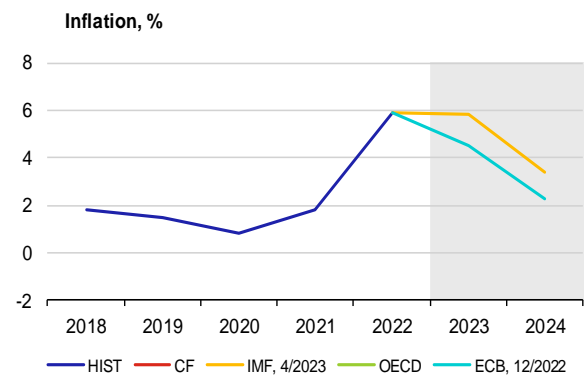
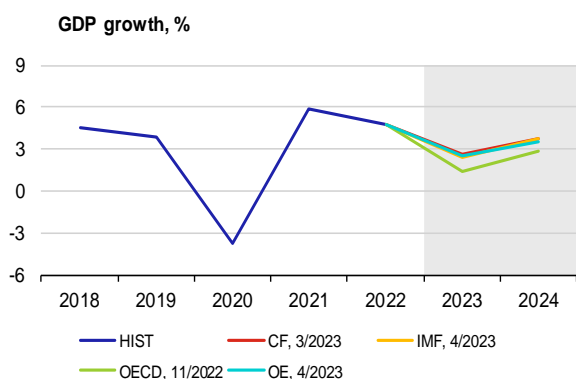|	CF	IMF		OECD	ECB
2023	n. a.	5.8	↗	n. a.	4.5
2024	n. a.	3.4	↗	n. a.	2.3

Ddd

Croatia

GDP growth, %

Inflation, %

Legend: HIST, CF, 3/2023, IMF, 4/2023, OECD, 11/2022, ECB, 12/2022
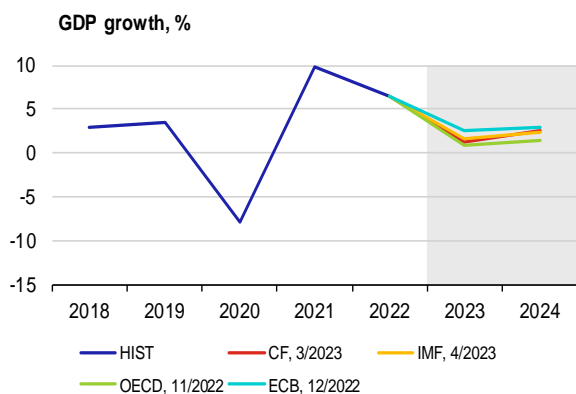
	CF		IMF		OECD	ECB
2023	1.2	↗	1.7	↘	0.8	2.5
2024	2.6	→	2.3	↘	1.5	3.0

	CF		IMF		OECD	ECB
2023	7.2	↗	7.4	↗	6.3	7.4
2024	3.1	↗	3.6	↘	3.1	3.2

A5. GDP growth and inflation in other selected countries

Romania

GDP growth, %

Inflation, %

Legend: HIST, CF, 3/2023, IMF, 4/2023, OECD, 11/2022, OE, 4/2023

	CF		IMF		OECD	OE	
2023	2.6	→	2.4	↘	1.4	2.5	↗
2024	3.7	→	3.7	↘	2.8	3.5	→
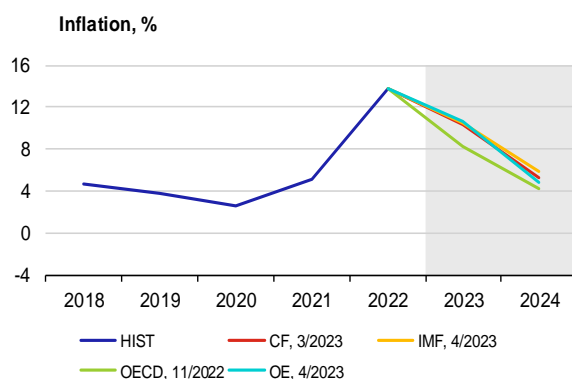
	CF		IMF		OECD	OE	
2023	10.4	↗	10.5	↘	8.3	10.6	↗
2024	5.3	↗	5.8	↗	4.2	4.8	↘

A6. List of abbreviations

AT	Austria		**IRS**	Interest Rate swap
bbl	barrel		**ISM**	Institute for Supply Management
BE	Belgium		**IT**	Italy
BoE	Bank of England (the UK central bank)		**JP**	Japan
BoJ	Bank of Japan (the central bank of Japan)		**JPY**	Japanese yen
bp	basis point (one hundredth of a percentage point)		**LIBOR**	London Interbank Offered Rate
CB	central bank		**LME**	London Metal Exchange
CBR	Central Bank of Russia		**LT**	Lithuania
CF	Consensus Forecasts		**LU**	Luxembourg
CN	China		**LV**	Latvia
CNB	Czech National Bank		**MKT**	Markit
CNY	Chinese renminbi		**MNB**	Magyar Nemzeti Bank (the central bank of Hungary)
ConfB	Conference Board Consumer Confidence Index		**MT**	Malta
CXN	Caixin		**NBP**	Narodowy Bank Polski (the central bank of Poland)
CY	Cyprus			
DBB	Deutsche Bundesbank (the central bank of Germany)		**NIESR**	National Institute of Economic and Social Research (UK)
DE	Germany		**NKI**	Nikkei
EA	euro area		**NL**	Netherlands
ECB	European Central Bank		**OE**	Oxford Economics
EE	Estonia		**OECD**	Organisation for Economic Co-operation and Development
EIA	Energy Information Administration			
ES	Spain		**OECD-CLI**	OECD Composite Leading Indicator
ESI	Economic Sentiment Indicator of the European Commission		**OPEC+**	member countries of OPEC oil cartel and 10 other oil-exporting countries (the most important of which are Russia, Mexico and Kazakhstan)
EU	European Union			
EUR	euro			
EURIBOR	Euro Interbank Offered Rate		**PMI**	Purchasing Managers' Index
Fed	Federal Reserve System (the US central bank)		**pp**	percentage point
FI	Finland		**PT**	Portugal
FOMC	Federal Open Market Committee		**RU**	Russia
FR	France		**RUB**	Russian rouble
FRA	forward rate agreement		**SI**	Slovenia
FY	fiscal year		**SK**	Slovakia
GBP	pound sterling		**SPF**	Survey of Professional Forecasters
GDP	gross domestic product		**TTF**	Title Transfer Facility (virtual trading point for natural gas in the Netherlands)
GR	Greece			
HICP	Harmonised Index of Consumer Prices		**UK**	United Kingdom
HR	Croatia		**UoM**	University of Michigan Consumer Sentiment Index - present situation
ICE	Intercontinental Exchange			
IE	Ireland		**US**	United States
IEA	International Energy Agency		**USD**	US dollar
IFO	Leibniz Institute for Economic Research at the University of Munich		**WEO**	World Economic Outlook
			WTI	West Texas Intermediate (crude oil used as a benchmark in oil pricing)
IMF	International Monetary Fund			
			ZEW	Centre for European Economic Research