Global Economic Outlook

March 2021

CNB CZECH NATIONAL BANK

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I. Introduction

COVID-19 has infected 120 million people worldwide; 68 million have recovered and 2.7 million have died ☹! **Luckily, the pace of vaccination is picking up.** Government measures and the acceleration of the vaccination process are probably behind the OECD's more positive macroeconomic forecast. It increased its estimate for the annual growth of the global economy for both 2021 (to 5.6%) and 2022 (to 4.0%). The USA recorded the most visible increase in the growth outlook for 2021, with expected annual growth doubling (to 6.5%). The euro area economy is also expected to grow faster this year (3.9%). A USD 1.9 trillion fiscal stimulus has been signed into law by President Biden, having been passed by the US Senate and the House of Representatives. This will see one-off payments of USD 1,400 to about 85% of Americans and will also extend until September the weekly federal unemployment payment of USD 300 (on top of the existing state support). The main news from Europe came in the conclusions of the last meeting of the Governing Council of the ECB, which confirmed the current interest rates and unconventional policy measures. The ECB will continue to purchase assets under the APP, TLTRO III and especially the PEPP. The ECB reassured the markets by announcing a further increase in the pace of asset purchases under PEPP compared to previous months. Support for the economy is also evident in the UK, where the Chancellor of the Exchequer unveiled the draft budget, which provides greater support to the economy. However, the still bleak pandemic situation in some territories worldwide, combined with a number of other factors, is damaging global growth outlooks. One such example is Brazil (more on this later in this issue).

March GDP growth and inflation outlooks for monitored countries, in %

GDP	EA	DE	US	UK	JP	CN	RU
2021	4.3 ⬂	3.4 ⬂	5.7 ⬈	4.6 ⬈	2.8 ⬈	8.4 ➡	2.9 ⬈
2022	4.2 ⬈	3.8 ➡	4.0 ⬂	5.8 ⬈	2.3 ➡	5.4 ⬂	2.5 ➡

Inflation	EA	DE	US	UK	JP	CN	RU
2021	1.5 ⬈	2.0 ⬈	2.4 ⬈	1.6 ⬈	-0.1 ⬈	1.5 ⬈	3.9 ⬈
2022	1.3 ⬈	1.6 ➡	2.2 ➡	2.0 ➡	0.5 ⬈	2.5 ⬂	3.9 ➡

Source: Consensus Forecasts (CF)
Note: The arrows indicate the direction of the revisions compared with the last GEO.
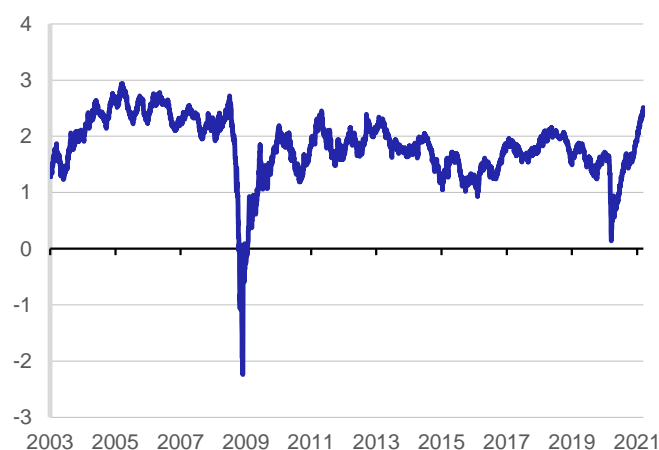
According to the CF analysts, **the March GDP growth outlooks** for the euro area and for Germany, its strongest economy, are slightly lower than in February. The growth outlooks for the other economies under review did not worsen. Japan has emerged from under the "dark cloud" of recent years, with growth of close to 3% expected in 2021. China's growth outlook for this year should have a similarly positive effect on the global economy. **The consumer price inflation outlooks** showed a general upward trend compared to February. After many years, inflation in Germany is expected to reach the notional 2% ideal. However, the euro area as a whole has some way to go to achieve this. Inflation in the USA is beginning to visibly exceed 2%. This, along with other signals from the US economy, is intensifying the debate on starting the normalisation of interest rates.

According to the March CF outlook, **the dollar** will weaken against all the monitored currencies at the one-year horizon. The CF outlook for the Brent price at the one-year horizon moved upwards compared to February, to USD 61.9/bbl (highest estimate USD 72/bbl, lowest estimate USD 47/bbl). **The outlook for 3M USD LIBOR market rates** is now rising, while that for 3M EURIBOR rates is still falling very slowly and remains negative.

The chart in this issue shows inflation expectations on the US financial markets. Expected inflation is derived from five-year financial instruments. The latest value shows the level of inflation expected on average by market players five years forward. This is clearly the highest value since the 2007–2009 financial crisis. This increase is related to a rise in yields on government bonds with longer maturities and a further easing of both

Five-year forward inflation expectation rate, in %

Source: Federal Reserve Bank of St. Louis
Note: Not seasonally adjusted.

monetary and fiscal policy in the fight against the pandemic. Involuntary savings created in the past, which consumers will want to spend after the measures are lifted, will most probably also have an inflationary effect.

The current issue also contains an analysis: How accurate are oil price forecasts? The article assesses the accuracy of the three oil price forecasts we comment on most often in GEO: 1) the forecast derived from the market curve based on Brent crude oil futures, 2) the US EIA's model-based forecast and 3) the predictions obtained from the regular Consensus Forecasts surveys.
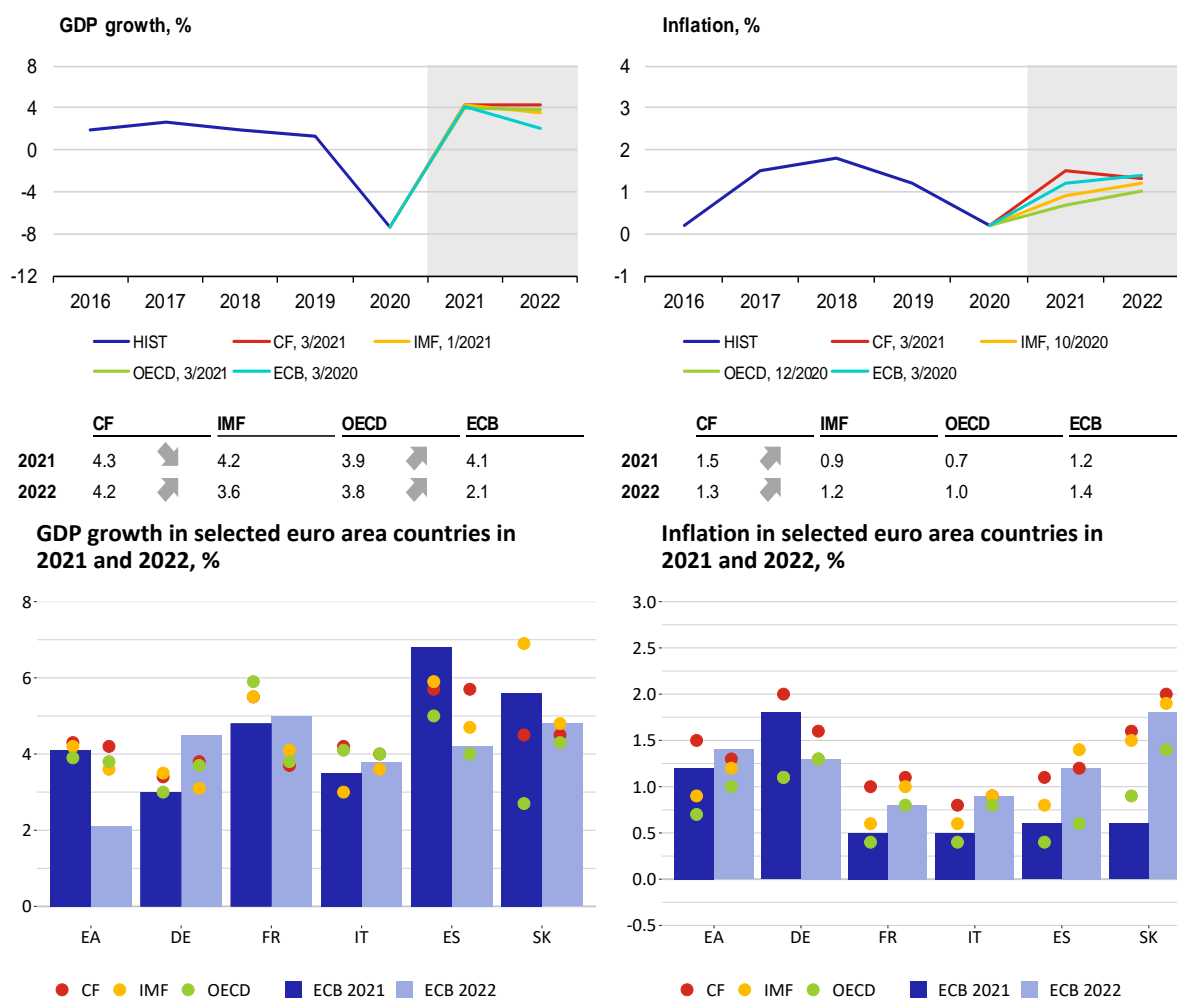
II.1 Euro area

The euro area economy contracted at the end of 2020 under the strain of the second wave of the pandemic, and a further decline is expected in 2021 Q1. Although some large economies (France and Spain) entered the new year with the pandemic situation relatively under control, others (Germany) have repeatedly had to extend nationwide lockdowns. The euro area recovery is thus delayed to 2021 Q2 in the optimistic scenario. Vaccination is the main hope for the months ahead and will accelerate in April after production capacity is expanded. Another vaccine (Johnson & Johnson) has been approved, and the European Commission has negotiated an increase in Pfizer-BioNTech vaccine supplies for Member States.

The sentiment of industrial firms continues to improve, while government closures are weighing heavily on the service sector. The eurozone manufacturing PMI increased to a three-year high in February (57.9). Capital goods producers recorded the highest demand and all the euro area countries except Greece were in the expansion band. Germany and the Netherlands fared the best, but managers' expectations in Italy and France are not bad either. Firms reported strong orders from abroad, but difficulties in supply chains worsened. Industrial production rose again in January, returning to its level one year ago. Industry at least has managed to recoup the losses caused by the pandemic. However, the services sector is badly hit by shutdowns, so the Eurozone services PMI was in the contraction band at the start of 2021. Consumer sentiment did not improve significantly either, based on the European Commission's February survey. The January decline in retail sales in the euro area (5.9% m-o-m) was driven by the countries most affected by restrictions (for example, Germany) and probably also by the postponement or cancellation of winter sales.

The worsening pandemic situation was reflected in a lower expected recovery in the euro area in 2021 (4.3%). According to the March CF, the euro area will also grow by more than 4% in 2022. However, private consumption and investment will pick up only gradually according to CF. Spain and France are expected to record the fastest growth this year

GDP growth, %

	CF		IMF	OECD		ECB
2021	4.3		4.2	3.9		4.1
2022	4.2		3.6	3.8		2.1

Inflation, %

	CF		IMF	OECD		ECB
2021	1.5		0.9	0.7		1.2
2022	1.3		1.2	1.0		1.4

GDP growth in selected euro area countries in 2021 and 2022, %

Inflation in selected euro area countries in 2021 and 2022, %

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

(5.7% and 5.5% respectively), while Germany is expected to grow by 3.4%. In 2022, the French, Italian and German economies will grow by less than 4%, while Spain is expected to maintain a growth rate of more than 6%.

The turnaround in prices in the euro area led to a further increase in the inflation outlook this year (1.5%). In January and February 2021, inflation in the euro area hovered at 0.9%. While core inflation slowed, it is slightly above 1.1%. In addition to one-off factors (such as a VAT increase in Germany), technical factors (a revision of weights in the basket) are behind the sharp shift in inflation. The postponement or cancellation of traditional winter sales may also have played a role. Inflation in Germany should average 2% this year and then slow to 1.6% in 2022. By contrast, subdued inflation is expected in Italy, and inflation in France will fluctuate around 1%. The current data gave rise to an upward movement in inflation expectations derived from market instruments. Analysts expectations, however, remain contained.

At its March meeting, the European Central Bank announced it would significantly accelerate the pace of asset purchases in Q2 compared to the first months of this year. Since the autumn, the ECB has been closely monitoring monetary conditions in the euro area, especially with regard to the euro exchange rate and interest rates. The decision to accelerate the purchases was mainly due to the increase in government bond yields visible since the start of the year, which was related more to movements in US long-term rates than to an improved economic outlook for the euro area. Following the announcement of a faster pace of purchases, bond yields in the euro area fell and the spreads of the countries in the south of the euro area narrowed. However, the envelope of the PEPP will remain at EUR 1.85 trillion until at least March 2022. No changes were made either to policy rates or to the provision of long-term liquidity to the banking sector. The new ECB forecast is characterised by higher expected growth and inflation. According to the ECB, euro area GDP will increase by 4.0% this year, 4.1% in 2022 and 2.1% in 2023. Inflation is expected at 1.5% this year, 1.2% in 2022 and 1.4% in 2023.

ESI leading indicators
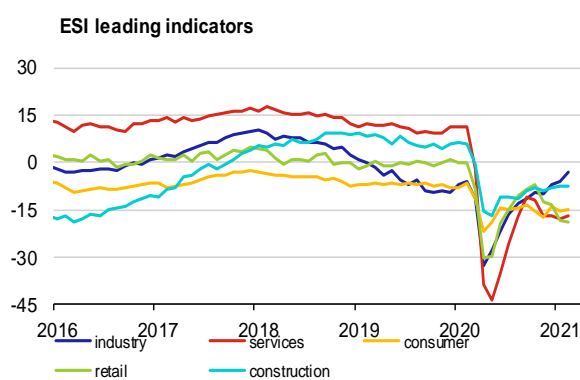
	industry	services	consum.	retail	constr.
12/20	-6.8	-17.1	-13.8	-13.2	-8.0
1/21	-6.1	-17.7	-15.5	-18.5	-7.7
2/21	-3.3	-17.1	-14.8	-19.1	-7.5

ESI leading indicators
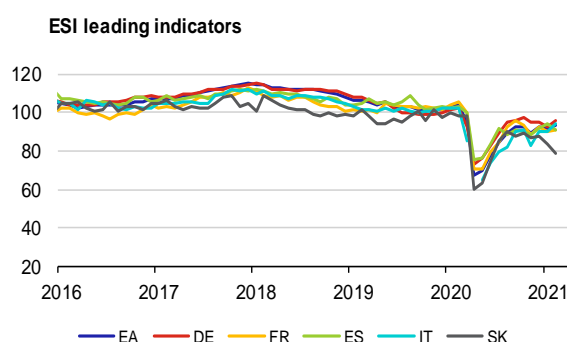
	EA	DE	FR	ES	IT	SK
12/20	92.4	95.1	92.8	91.5	89.8	87.9
1/21	91.5	92.8	90.1	93.9	90.2	83.3
2/21	93.4	95.8	91.0	90.7	94.6	79.2

Interest Rates, %
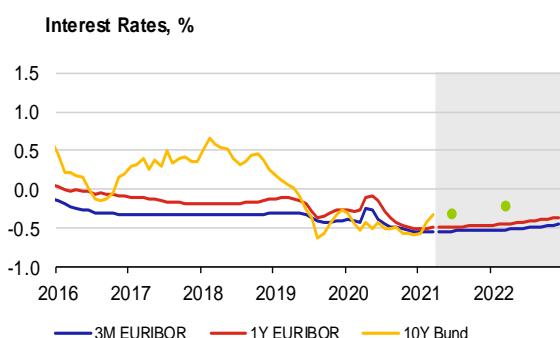
	2/21	3/21	6/21	3/22
3M EURIBOR	-0.54	-0.54	-0.54	-0.51
1Y EURIBOR	-0.50	-0.48	-0.48	-0.44
10Y Bund	-0.42	-0.32	-0.30	-0.20

Inflation expectations in the euro area, %

Note: Inflation expectations based on 5year inflation swap and SPF

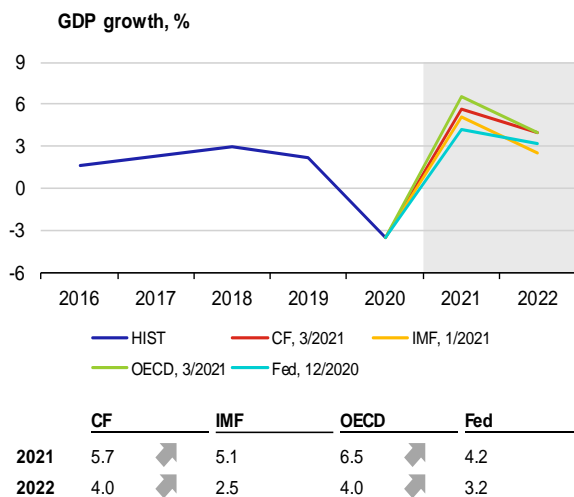|	5y5y	SPF
1/21	1.31	1.69
2/21	1.34	1.69
3/21	1.41	1.69

II.2 United States

US President Joe Biden pushed through his USD 1.9 trillion fiscal support plan. A record sum has thus been allocated to boost the US economy after the pandemic year. The fiscal support is having a positive impact on the expected growth of the US economy, especially in 2021. According to the most recent CF outlook, GDP will grow by 5.7% this year, a whole percentage point more than predicted a month ago. The new OECD outlook is even more optimistic, expecting growth of 6.5%. Both CF and the OECD also expect higher growth in 2022 than in their previous forecasts. This is due to positive news on the coronavirus pandemic. Daily increases in new cases have dropped to around 50,000, one-fifth of the number from the beginning of this year. The pace of vaccination is meanwhile picking up. Over 2.2 million doses of the vaccine are being administered daily. At present, a quarter of the US adult population has been inoculated, and vaccination should be completed in May if all goes to plan. This has allowed a gradual easing of restrictions in some states, which has again had a positive impact on expectations.
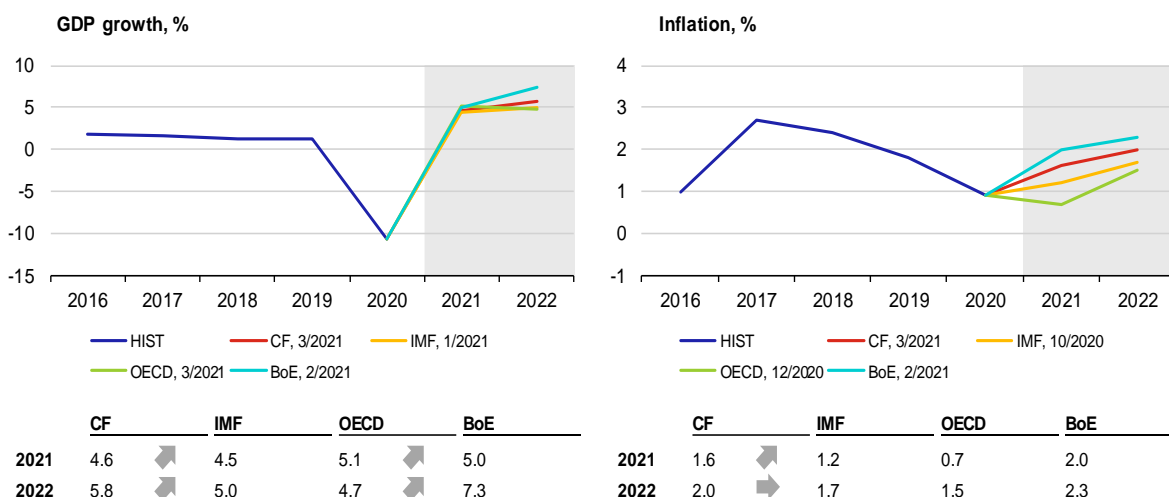
The pandemic has seen significant growth in people's savings, estimated at around USD 1.5 trillion. The additional savings, accumulated due to a limited ability to spend during the pandemic, are expected to support the economic recovery as soon as the epidemic is brought under control and restrictions are eased. It is not yet clear whether these savings will be used for consumption or investment and repaying debt. In the first case, they could have an accelerating effect on inflation. In January, the household saving rate exceeded 20%, while retail sales rose year on year by a record 7.4%, the biggest increase in ten years. Unemployment fell slightly again to 6.2% and non-farm payrolls rose by almost 380,000.

Annual inflation in the USA accelerated to 1.7% in February, due mostly to rising prices of food (3.6%), services (1.3%) and energy (3.7%). CF increased its inflation outlook for 2021 by 0.1 pp to 2.4%. The new outlook for 2022 continues to expect consumer prices to rise by 2.2%.

GDP growth, %

	CF		IMF	OECD	Fed
2021	5.7	↗	5.1	6.5 ↗	4.2
2022	4.0	↗	2.5	4.0 ↗	3.2

Inflation, %

	CF		IMF	OECD	Fed
2021	2.4	↗	2.8	1.9	1.8
2022	2.2	→	2.1	1.7	1.9

Leading indicators

	ConfB curr.	ConfB exp.	UoM curr.	UoM exp.
12/20	87.2	87.0	90.0	74.6
1/21	85.5	91.2	86.7	74.0
2/21	92.0	90.8	86.2	70.7

Interest Rates, %

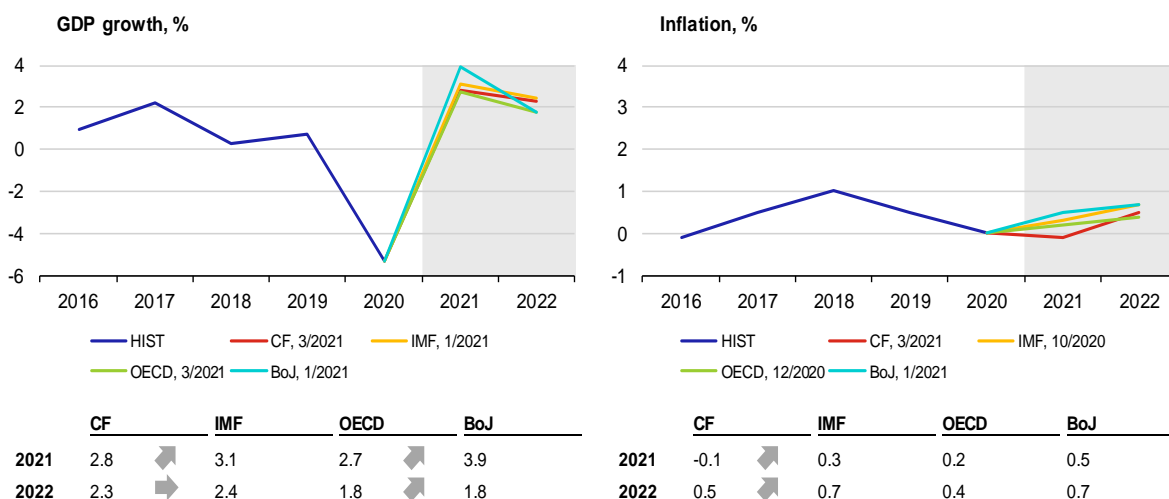|	2/21	3/21	6/21	3/22
USD LIBOR 3M	0.19	0.18	0.17	0.21
USD LIBOR 1R	0.30	0.30	0.29	0.42
Treasury 10R	1.24	1.57	1.50	1.80
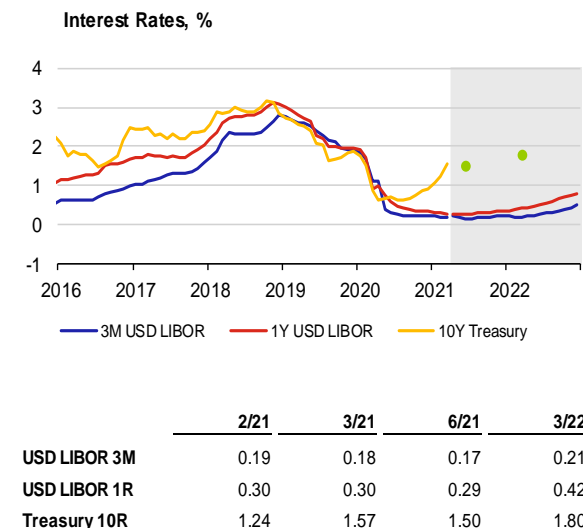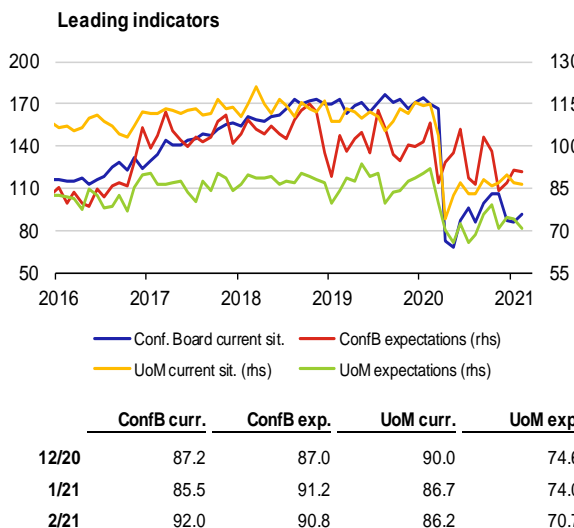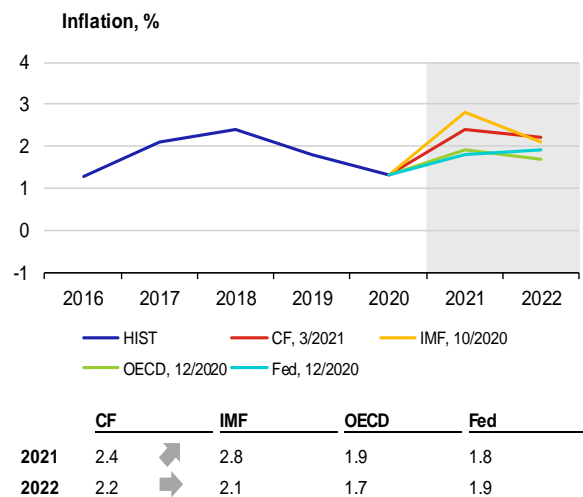
II.3 United Kingdom

Chancellor of the Exchequer Rishi Sunak unveiled the new UK budget, in which he plans to provide greater support to the economy. This mainly involves the extension of large support packages at least until September 2021. Sunak also revealed plans for tax rises necessary to pay for pandemic spending. At GBP 400 billion, the UK currently has its highest peacetime budget deficit. Despite rapid vaccination, the NIESR projects a decline in GDP of 3.4% in 2021 Q1 (mostly due to lockdown). A sharp decline in UK–EU trade caused by Brexit is not helping the UK economy in Q1 either. Although tariffs have been avoided, trade is still being disrupted due to higher transport costs, shipping delays, health certificate requirements and more complex customs requirements at borders. The new CF and OECD forecasts expect higher economic growth both this year and the next. The composite PMI rose to 49.6 in February (thus remaining just inside the contraction band) owing to a smaller reduction in activity in the services sector and faster expansion in production.
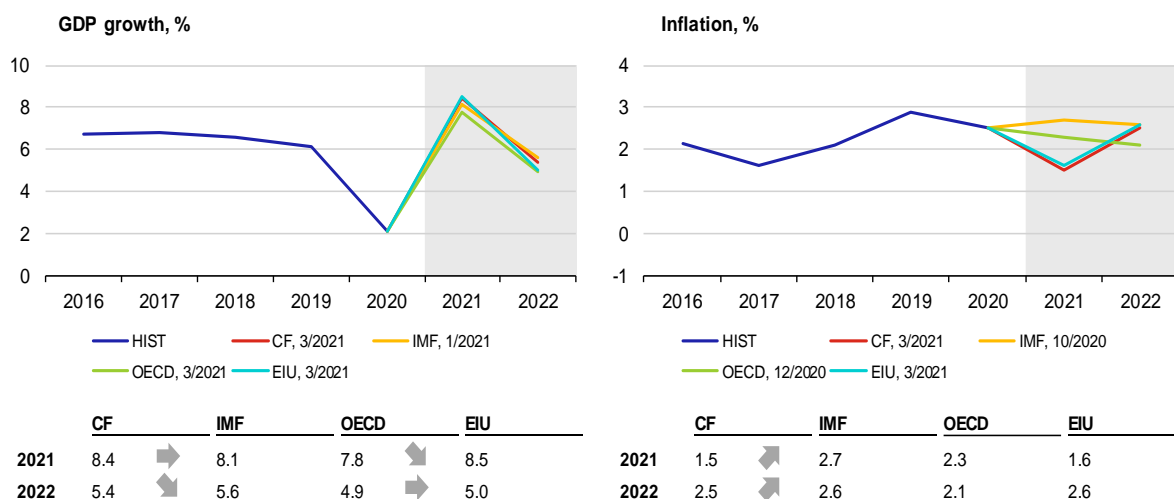
GDP growth, %

Inflation, %

	CF		IMF	OECD		BoE
2021	4.6	⬈	4.5	5.1	⬈	5.0
2022	5.8	⬈	5.0	4.7	⬈	7.3

	CF		IMF	OECD	BoE
2021	1.6	⬈	1.2	0.7	2.0
2022	2.0	➡	1.7	1.5	2.3

II.4 Japan

Japan's economic growth exceeded expectations in 2020 Q4, bringing hope of a rapid return to the pre-pandemic level. With quarter-on-quarter GDP growth of 2.8%, Japanese GDP climbed in Q4 to a level only 1.4% lower than in the same period a year earlier. The economic outlook is therefore more favourable than in the 2008–2009 recession, when it took Japan several years to return to the pre-crisis level. The growth in private consumption (especially of durable goods), government expenditure and net exports that began in 2020 Q3 continued into Q4. Private investment also rose. Due to the continuing fiscal stimulus, government consumption and investment also increased in year-on-year terms, unlike the other components of GDP. The result of the long-awaited BoJ monetary policy review is expected in March. However, statements made by central bankers do not indicate that the BoJ will abandon QE, negative rates or yield curve control.

GDP growth, %

Inflation, %

	CF		IMF	OECD		BoJ
2021	2.8	⬈	3.1	2.7	⬈	3.9
2022	2.3	➡	2.4	1.8	⬈	1.8

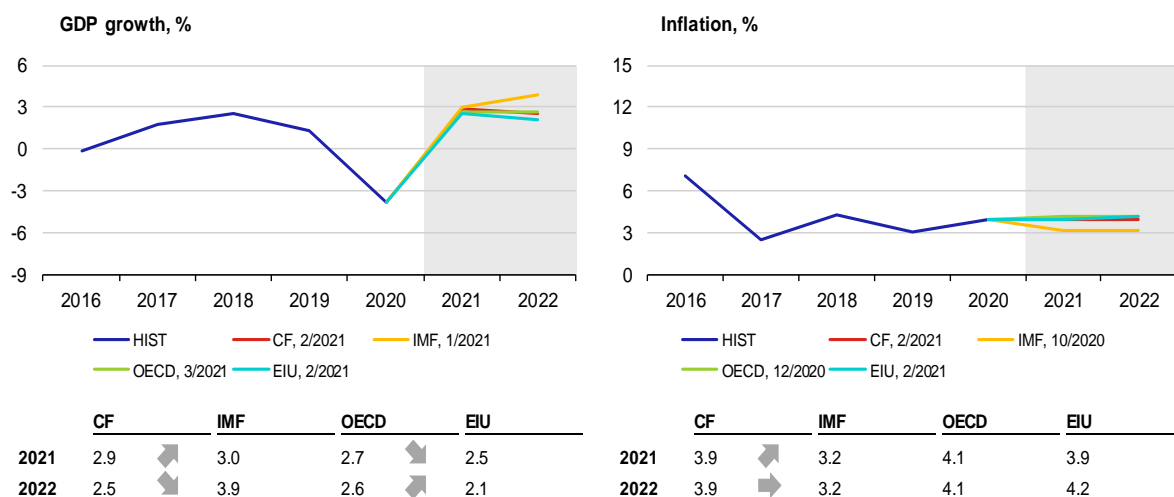|	CF		IMF	OECD	BoJ
2021	-0.1	⬈	0.3	0.2	0.5
2022	0.5	⬈	0.7	0.4	0.7

II.5 China

Economic growth in China will accelerate sharply this year, driven mainly by private consumption. The latter had already recovered at the end of 2020 from the significant downturn caused by the coronavirus crisis. In addition to effective government measures to prevent the uncontrolled spread of the virus, the Chinese economy is now benefiting from the loss of competition caused by the deterioration of the global epidemic situation and from increased demand for healthcare products. According to the CF analysts' March outlook, the Chinese economy will record annual growth of 8.4% in 2021, the fastest growth in a decade. The growth rate is expected to slow to 5.4% next year. Annual consumer price inflation edged down further to 0.2% in February, due mainly to base effects reflecting the sharp rise in the price of pork a year ago. According to the CF analysts, consumer prices in China will rise on average by 1.5% this year and by 2.5% in 2022.

GDP growth, %

Inflation, %

	CF		IMF	OECD		EIU
2021	8.4	→	8.1	7.8	↘	8.5
2022	5.4	↓	5.6	4.9	→	5.0

	CF		IMF	OECD	EIU
2021	1.5	↗	2.7	2.3	1.6
2022	2.5	↗	2.6	2.1	2.6

II.6 Russia

Some industrial sectors of the Russian economy are nearing the pre-pandemic level and inflation is rising. Following eight months of year-on-year decline, industrial production recorded year-on-year growth in December but returned to a decline of 2.5% in January. Industrial production has nonetheless been rising rapidly from its trough last May and is now roughly at the early-2019 level. However, the return to the pre-pandemic level varies very much from sector to sector. While manufacturing in final consumption sectors has now exceeded this level, the mining industry is below it. Motor vehicle and electrical equipment manufacturing are thriving, for example. Inflation rose by 0.5 pp to 5.7% in February. The Russian central bank is expecting inflation to return to the 4% target next year.
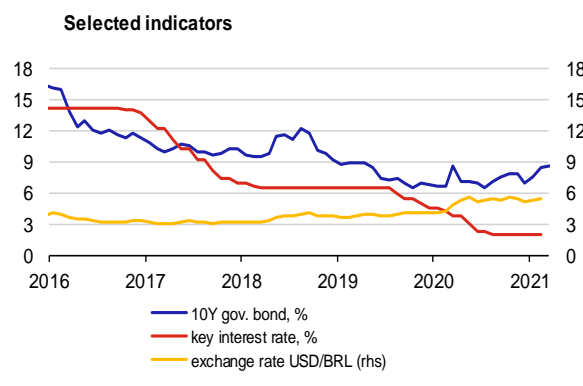
GDP growth, %

Inflation, %

	CF		IMF	OECD		EIU
2021	2.9	↗	3.0	2.7	↘	2.5
2022	2.5	↓	3.9	2.6	↗	2.1

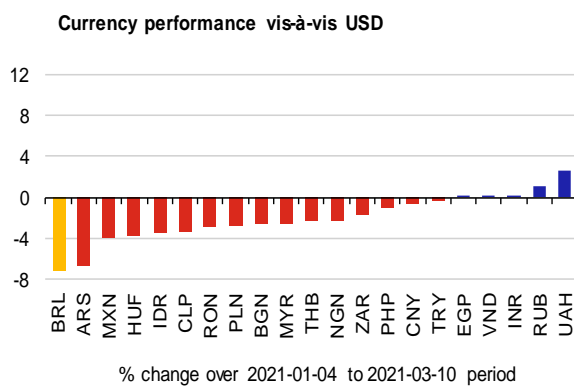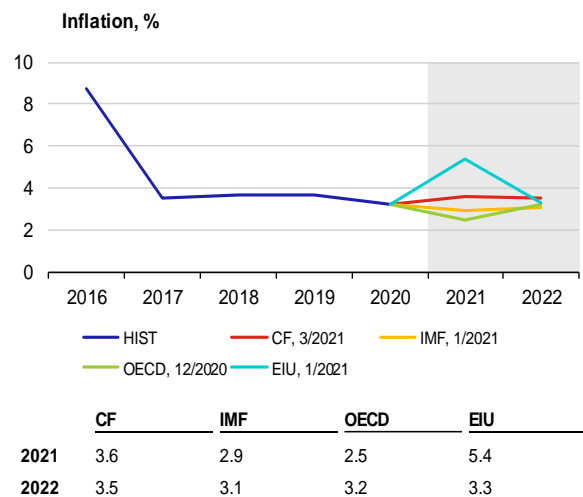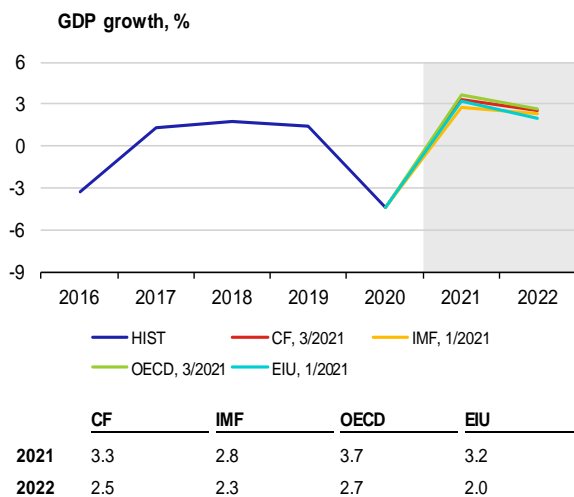|	CF		IMF	OECD	EIU
2021	3.9	↗	3.2	4.1	3.9
2022	3.9	→	3.2	4.1	4.2

II.7 Brazil

Quarterly GDP growth in the largest Latin American economy slowed from 7.7% to 3.2% in 2020 Q4. Even so, Brazil is one of the fastest-growing emerging economies after the first wave of the coronavirus pandemic. The Brazilian central bank has maintained its rates at 2% since August, but has already signalled a hawkish tone. Consumer price inflation went up to 5.2% year on year in February, its highest level since January 2017, and is well above the inflation target (3.75%). The unemployment rate fell slightly in December but is still high at 13.9%. The Brazilian real has weakened by 7% to USD 5.6/BRL since the start of the year.

A further wave of the pandemic, combined with a number of other factors, is damaging the outlook for the Brazilian economy. The number of new cases and deaths in the country has been trending up since the start of 2021. Slightly encouraging news is that Brazil is expecting about 22 million doses of the vaccine to arrive in March (for a population of around 212 million). However, President Bolsonaro caused nervousness on financial markets when he removed the director of state-owned energy corporation Petrobras due to disputes over regulated fuel prices and indicated he was considering action against other state-owned firms. This was reflected in increased exchange rate volatility. Last but not least, it is very likely that a further support package of USD 7.5 billion will be approved due to the pandemic. The financial markets are closely monitoring the above factors and fear possible fiscal insolvency and the suspension of reform efforts.

GDP will grow by around 3% this year according to most institutions. The fiscal stimulus will provide only a partial boost due to the again escalating coronavirus crisis, vaccine shortages and growing debt. Growth of 2.0%–2.7% is projected for 2022. There is great uncertainty regarding consumer price inflation this year, but most institutions expect inflation to remain below the BCB's target. Inflation of around 3.3% is estimated for 2022. CF projects an exchange rate of USD 5.30/BRL this year and a modest appreciation to USD 5.08/BRL in 2022. For interest rates, it estimates a gradual rise to an average of 3.6% in 2022.

GDP growth, %

	CF	IMF	OECD	EIU
2021	3.3	2.8	3.7	3.2
2022	2.5	2.3	2.7	2.0

Inflation, %

	CF	IMF	OECD	EIU
2021	3.6	2.9	2.5	5.4
2022	3.5	3.1	3.2	3.3

Currency performance vis-à-vis USD

% change over 2021-01-04 to 2021-03-10 period

Selected indicators

	10Y gov. bond, %	interest rate, %	USD/BRL
12/2020	6.91	2.00	5.15
1/2021	7.57	2.00	5.36
2/2021	8.49	2.00	5.42

III. Leading indicators and outlook of exchange rates

OECD Composite Leading Indicator
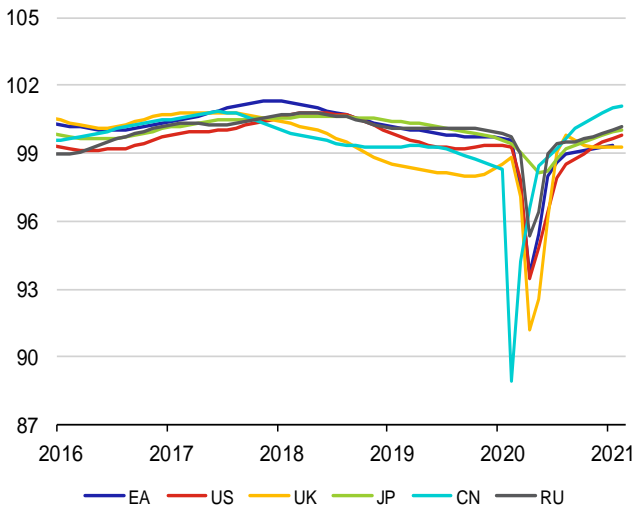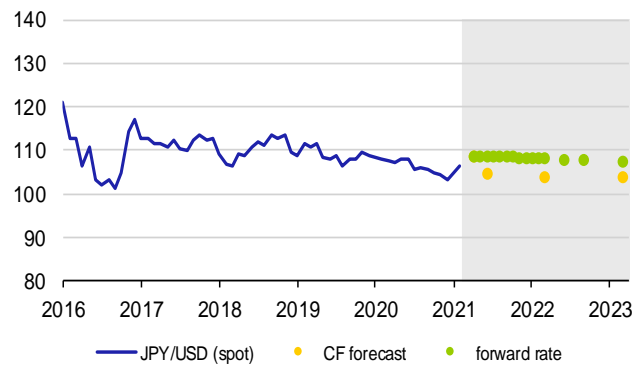

The US dollar (USD/EUR)
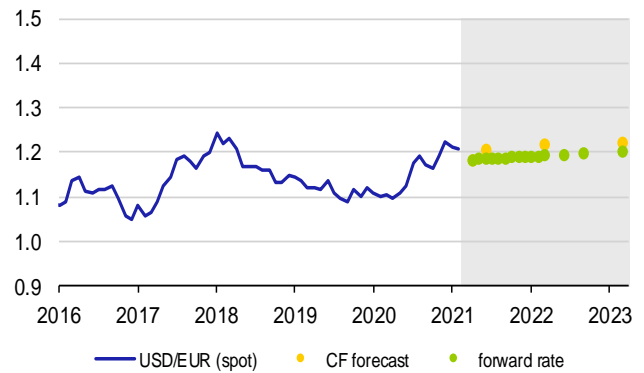
	8/3/21	4/21	6/21	3/22	3/23
spot rate	1.186				
CF forecast		1.186	1.206	1.218	1.224
forward rate		1.186	1.187	1.195	1.205

The British pound (GBP/USD)
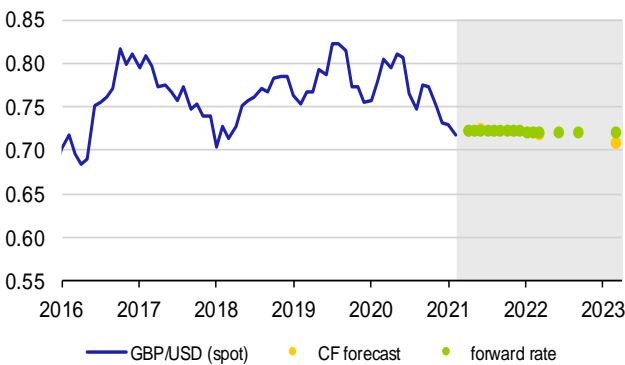
	8/3/21	4/21	6/21	3/22	3/23
spot rate	0.724				
CF forecast		0.724	0.725	0.720	0.710
forward rate		0.723	0.723	0.722	0.722

The Japanese yen (JPY/USD)

	8/3/21	4/21	6/21	3/22	3/23
spot rate	108.9				
CF forecast		108.9	104.7	103.9	104.2
forward rate		108.8	108.8	108.4	107.6

The Chinese renminbi (CNY/USD)
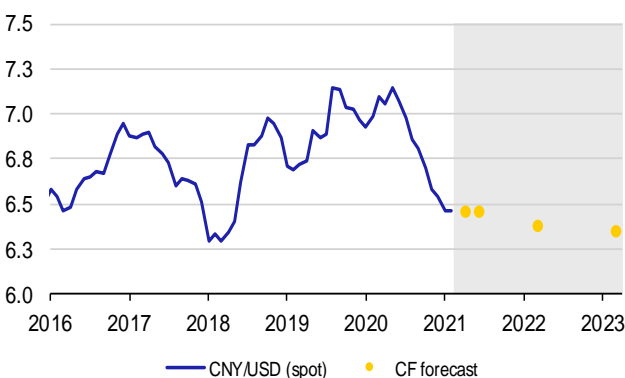
	8/3/21	4/21	6/21	3/22	3/23
spot rate	6.524				
CF forecast		6.468	6.462	6.387	6.356

The Russian rouble (RUB/USD)
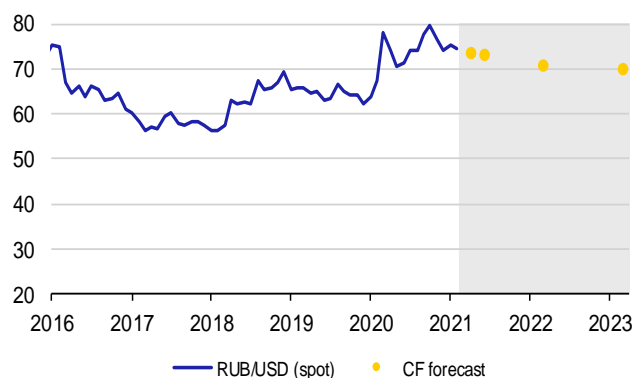
	8/3/21	4/21	6/21	3/22	3/23
spot rate	74.52				
CF forecast		73.50	73.43	70.89	70.05

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 crude oil price returned to rapid growth at the start of February and even temporarily broke through the USD 70/bbl level in the first half of March. Saudi Arabia's voluntary commitment to unilaterally cut production by a further one million barrels a day beyond the OPEC+ agreement took effect in February. The oil supply deficit on the market thus increased. In addition to restricted production, rising oil prices were supported by unusually cold weather in the northern hemisphere and the increasing likelihood of the approval of the US fiscal stimulus. An improving outlook for global oil demand owing to a declining trend in new coronavirus cases worldwide and accelerating vaccination acted in the same direction. The stronger decline in global oil stocks was also driven by an oil production shortfall in the USA due to severe frosts in Texas. At the start of March, the price of oil fell temporarily ahead of the OPEC+ meeting, which was expected to increase production by up to 1.5 million barrels a day. OPEC+ made a surprise decision at the summit not to raise output in April. Subsequently, the price of Brent rose briefly above USD 70/bbl, helped along by a report of a missile attack on oil infrastructure in Saudi Arabia. However, this caused no damage and the price of Brent corrected back to around USD 68/bbl. Some analytical institutes have revised their Brent price outlooks upwards, and their estimates for 2021 H2 are even above USD 70/bbl. However, the March CF expects the price to decline to USD 61.4/bbl at the three-month horizon, followed by an only moderate increase to USD 61.9/bbl at the one-year horizon. The market curve in the first half of March was signalling a decline in the Brent price from its current value to about USD 61/bbl and USD 58/bbl at the end of 2021 and 2022 respectively. The EIA expects a fast decline in 2021 Q2 to USD 58/bbl in July, followed only by a slight rise, as the sharp decline in global inventories should be replaced by modest growth in 2021 H2 and 2022.

Outlook for prices of oil (USD/barrel) and natural gas (USD / 1000 m³)
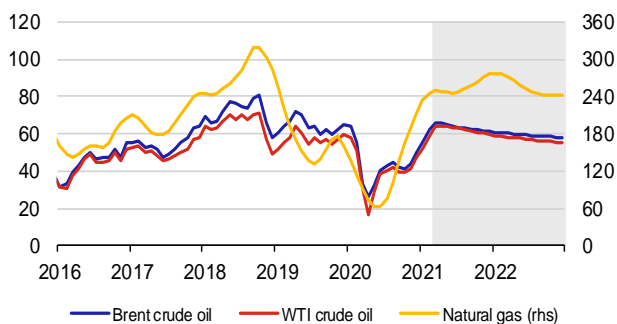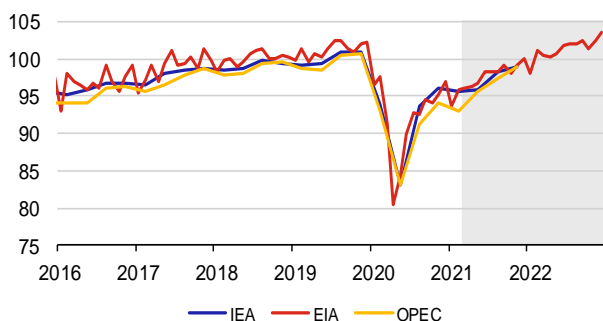

	Brent		WTI		Natural gas	
2021	62.73	↗	61.20	↗	253.08	↘
2022	59.40	↗	57.08	↗	255.73	↘

Total stocks of oil and oil products in OECD (bil. barrel)
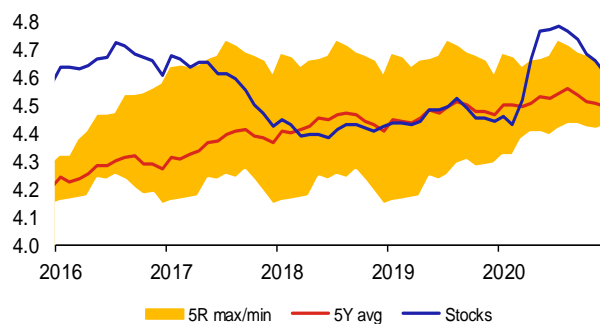
Global consumption of oil and oil products (mil. barrel / day)

	IEA		EIA		OPEC	
2021	97.14	→	97.50	↘	96.25	↗
2022			101.33	↗		

Production, total and spare capacity in OPEC countries (mil. barrel / day)
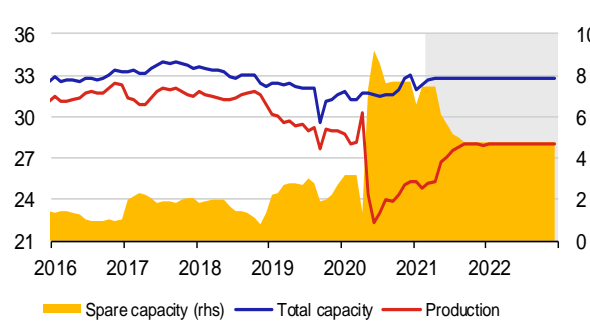
	Production		Total capacity		Spare capacity	
2021	26.80	↘	32.63	↗	5.83	↗
2022	27.99	↗	32.76	↗	4.77	↗

Source: Bloomberg, IEA, EIA, OPEC, CNB calculation
Note: Oil price at ICE, average gas price in Europe – World Bank data, smoothed by the HP filter. Future oil prices (grey area) are derived from futures and future gas prices are derived from oil prices using model. Total oil stocks (commercial and strategic) in OECD countries – IEA estimate. Production and extraction capacity of OPEC – EIA estimate.

IV.2 Other commodities

**The average natural gas price in Europe fell by 15% month on month in February due to milder weather, but prices this year are still the highest since January 2019.** This is due to much lower inventories, which fell further from 51% of total capacity at the end of January to 37% at the end of February. Despite seeing a modest decline in February, coal prices are also close to a two-year high, supported by prices of alternative energy sources in spite of weakening imports to China.

The non-energy commodity price index kept rising in February and the first half of March, this time driven mainly by the industrial metals sub-index. On the other hand, a declining outlook for the food commodity price sub-index continues to play the largest role in driving the downward outlook for the overall index.

Growth in the industrial metals price sub-index accelerated again in February and the first half of March due to a continuing recovery in global manufacturing and low stocks of some metals. The J.P. Morgan Global Manufacturing PMI rose in February from 53.6 to 53.9 (a three-year high), due mainly to expected future output. Aluminium, copper and tin prices continued to rise strongly. Prices of other metals and iron ore stopped rising in February. Imports of iron ore to China remain strong. Global steel production was 4.8% higher in January. The outlooks for prices of most metals are around current levels, with only the iron ore outlook showing a strong decline.

After a large increase in January, the food commodity price sub-index showed only weak growth in February and the first half of March. Only beef and in particular pork prices recorded higher growth. The sharply declining outlook for the index is mainly due to expectations of a correction in corn and soy prices, which have recorded the strongest price growth since the middle of last year.

Non-energy commodities price indicies
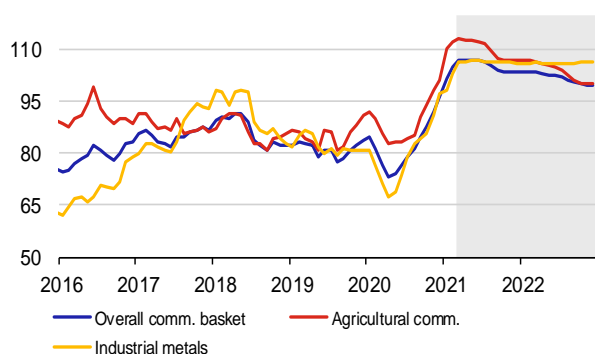
	Overall		Agricultural		Industrial	
2021	105.2	↗	110.3	↗	105.6	↗
2022	102.0	↗	103.8	↗	106.2	↗

Food commodities
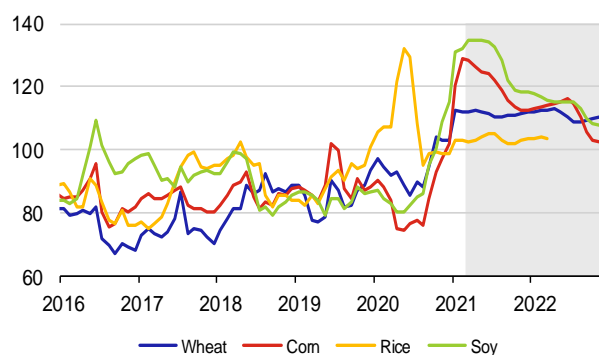
	Wheat		Corn		Rice		Soy	
2021	111.7	↗	120.7	↗	103.4	↗	128.3	↗
2022	111.0	↗	110.5	↗	103.9	↗	113.3	↗

Meat, non-food agricultural commodities
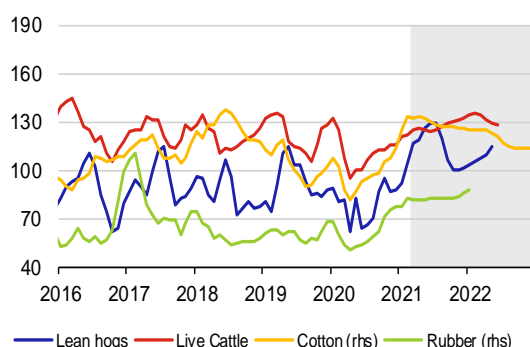
	Lean hogs		Live Cattle		Cotton		Rubber	
2021	112.0	↗	126.4	↗	89.2	↘	58.1	↗
2022	108.1	↗	132.1	↗	82.7	↘	61.7	★

Basic metals and iron ore
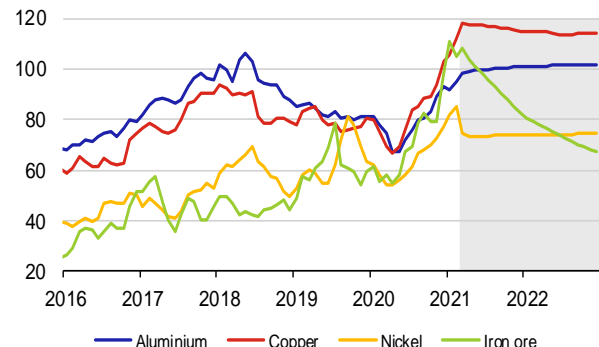
	Aluminium		Copper		Nickel		Iron ore	
2021	98.8	↗	115.4	↗	75.4	↗	96.7	↗
2022	101.4	↗	114.1	↗	74.1	↗	73.4	↗

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.

How accurate are oil price forecasts?[1]

Oil prices strongly affect many economic variables and are therefore an important input to many economic models. From the central bank's perspective, their effects on prices in manufacturing, consumer prices, aggregate demand and the balance of trade are of greatest importance. The governments of oil-exporting countries additionally have to take into account the supply-s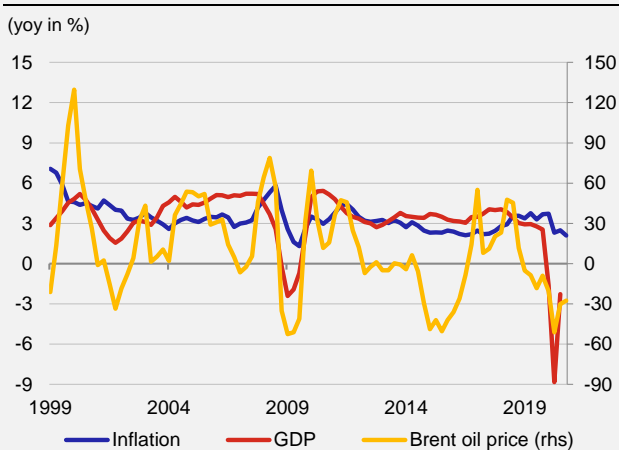ide response and the impacts on national budgets. It is thus important to monitor past, present and projected future trends in oil prices. There are a large number of oil price forecasts, yet the vast majority of them are not normally available to the public. In this article, we will assess the accuracy of the three oil price forecasts we comment on most often in GEO – the forecast derived from the market curve based on Brent crude oil futures, the US EIA's model-based forecast and the predictions obtained from the regular Consensus Forecasts surveys.

Introduction

Oil prices affect many macroeconomic and microeconomic variables (and in turn are affected by some of them). At the macroeconomic level, the effects of the oil price on the price level and GDP are monitored most closely. Oil prices affect inflation both directly (via the prices of energy consumed directly by households) and indirectly (via the costs of consumer goods producers and service providers). Prices of oil affect economic activity via households' real disposable income and firms' costs and thus impact on consumption and investment. In addition, oil prices have an effect on various aspects of the external balance of an economy. The impacts vary depending in particular on whether the country is a net exporter or net importer of oil, but the origin of the shock to oil prices (demand, supply) and the country's economic level also play a role (see, for example, Kilian et al., 2007). The most visible effect is, of course, that on the balance of trade. However, in countries that export oil and are dependent on oil export earnings, the effects on government budgets and on the country's exchange rate may also be significant.[2]

At the microeconomic level, oil prices affect households' consumption behaviour and firms'

Chart 1 – Oil price, inflation and GDP growth in the world

(yoy in %)

Source: ICE, Bloomberg, OECD
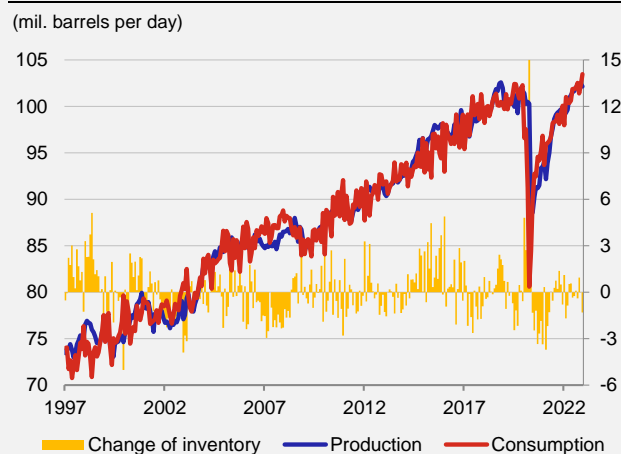Note: Inflation and GDP is shown for G20 countries.

decisions. The firms may be oil producing companies and firms providing services incidental to oil extraction, followed in the production chain by companies that process crude oil, i.e. convert it into petroleum products. At the end of this chain are firms and households that consume petroleum products, mostly in the form of fuels and chemical products. At all levels, there are also transport and other companies that store oil and oil products. In the short run, all these players tend to respond to a change in the oil price solely by adjusting supply or demand. However, in the longer run they have to make important strategic and investment decisions, for which they need to estimate the likely future path of oil prices.

Besides physical supply and demand, there are "paper" oil traders on the market in the form of investors and investment funds. They do not want to own physical oil or

Chart 2 – World oil production, consumption and change of inventories

(mil. barrels per day)

Source: EIA inc. forecast

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[2] By contrast, the impact of the US dollar exchange rate on oil prices, although rather short term, is very strong in the opposite direction. Given that the bulk of oil is quoted in USD, a weakening (strengthening) of the dollar reduces (increases) the price of oil for countries whose currencies have strengthened (weakened) against the dollar, thus increasing (reducing) both demand from those countries and the price of oil. The negative correlation between the dollar exchange rate and the oil price also relates to sudden changes in market sentiment. If investors' risk aversion increases, they invest more in secure dollar assets, and demand for risky assets such as commodities conversely falls. An increase (decrease) in risk aversion thus causes the dollar to appreciate (depreciate) and the oil price to drop (rise). However, these correlations are not very useful for predicting oil prices, as dollar exchange rate forecasts are not very accurate either.

petroleum products. Instead, they merely want to buy or sell futures contracts, trading either among themselves or acting as a counterparty to other agents in the market wishing to hedge their future (physical) production or consumption. Investors try to estimate the future path of oil prices and on this basis take a certain side in the deal in order to make a profit. These investors (speculators) ultimately affect neither the physical supply nor the physical demand in the market and hence have no effect on the price of oil in the long run. Nonetheless, their herd behaviour can lead the price of oil to react to currently perceived changes in physical fundamentals by rising or falling excessively in the short to medium run, as information on actual trends is mostly limited or lagged. These agents, too, need oil price forecasts for their investment decisions.

Oil prices therefore reflect not only fundamental factors such as (physical) demand, (physical) supply and inventories, but, in the shorter term, market sentiment and risk perceptions as well. The risk is linked mainly to the level of spare extraction capacity, the geopolitical security situation in drilling regions or in areas important for oil transport, and political developments affecting international trade. However, the oil price forecast is further complicated by frequent non-market interventions, as there are many firms, mainly on the supply side, that are used to further governments' political goals. In the short to medium term, the forecast is also complicated by the existence of OPEC (recently OPEC+). Although it responds to current supply, demand and inventory levels, its policy and goals can change abruptly. In the longer term, the situation is also affected by difficult-to-predict scientific and technical progress – both on the supply side, where oil is getting cheaper to extract and the amount of oil available is rising, and on the demand side, where more efficient use of resources may lead to a fall in oil consumption and to substitution by renewable energy sources. This substitution is amplified by political pressures and pressures from various interest groups and so may not solely reflect current economic factors.

How to choose the right forecast

There are a large number of oil price forecasts, differing in terms of time horizon, data frequency, publication frequency, modelling technique and availability to the public. Most oil price forecasts are produced by commercial institutions (oil companies, banks, investment groups and large traders) and are designed solely for the needs of the institution in question or for small numbers of subscribers. They reach the general public only occasionally and with a lag. In addition, some public and international institutions, universities and research institutes produce their own forecasts, most of which are available free of charge. A separate category is formed by surveys conducted by agencies such as Bloomberg, Reuters and Consensus Economics, which produce forecasts based on a combination of estimates obtained from individual respondents. Forecasts can be long term (over decades, mostly in real prices) or for just the next few months. They can be point-based (for a certain date, or the average for a certain period) or continuous, containing a path of future values, more or less aggregated (in the form of monthly to annual averages). Last but not least, forecasts can pertain to various types of oil.

Just as there are a large number of forecasts, there are a whole range of approaches to evaluating and comparing them. We can choose a specific date in the future and compare how the value expected for this date gradually changes for each forecast as the forecasting horizon shrinks (fixed event forecasts). An alternative option is to compare the individual forecast sources while keeping the forecast length fixed (rolling event forecasts). For example, Moghaddam et al. (2018)[3] compare the estimates of 13 institutions based on an assessment of their oil price forecasts for three fixed dates. To do so, they use the efficiency and bias of the forecasts as criteria[4] and they also examine possible sources of failure to meet these criteria. (Weak) forecast efficiency means that the sequence of revisions of forecasts satisfies the criterion for a random walk, i.e. the revisions cannot be systematically estimated on the basis of past revisions. The test for unbiased forecasts can only be performed ex post with knowledge of the actual outcome. The mean forecasting error (MFE) should ideally be zero. According to the authors, of the 1994–2004 forecasts for 2005, 2010 and 2015 prices, only the IEA, EIA and World Bank forecasts met this criterion. However, failure to satisfy this criterion may be due to large and unpredictable shocks on the oil market. The sources of forecast inefficiency can include rigidity (where a forecaster faced with new information is unable to distinguish between the noise and the signal) and myopia (where the forecast is influenced by the current value). Often added to this is an expectation of exponential growth in real prices, based, for example, on Hotelling's theory of exhaustible resources (1931) or on the theory of growing demand due to rising incomes.

Where individual forecasts fail, attempts are often made to combine them in order to improve the resulting forecast. Bates and Granger (1969) can be considered the pioneers of this approach. Baumeister (2014) also recommends combining forecasts. Doing so mitigates against possible individual model misspecifications and smooth structural changes. However, it can only be beneficial if the individual models are based on different information sets, which is not usually the case. If the individual forecasts use the same information sets, they tend to be correlated with one another, so combining them may not achieve a better forecast. The fact that they are all highly correlated with the price of oil at the time of the forecast also contributes to the correlation of individual forecasts.

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[3] This study also serves as an extensive review of the literature on the techniques used to forecast oil prices (for example, parametric and non-parametric econometric models and computational approaches such as neural networks) and the methods used to evaluate forecasts (based on accuracy, efficiency, bias and other criteria).
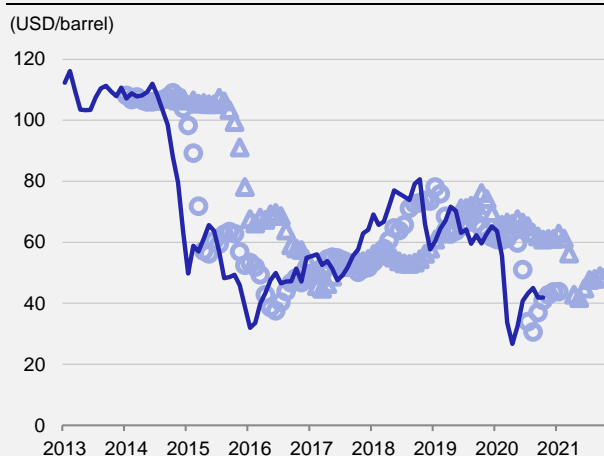
[4] Diebold and Lopez (1996) state that optimal forecasts should be unbiased and efficient.

What forecasts will we compare?

The choice of forecasts analysed below is determined mainly by their availability, thanks to which they are often cited and commented on in GEO. We include the Consensus Forecasts predictions published monthly by Consensus Economics and the forecasts issued by the US Energy Information Administration (EIA) in its monthly Short-Term Energy Outlook (STEO). These external forecasts will be compared with two internal CNB forecast types – the standard futures-based forecast and a naïve forecast related to a random walk process, constructed solely for this analysis. The external forecasts are only available for the short and medium term of up to two years ahead, so both of our forecasts will be shortened to this length.[5]

Brent crude oil price forecasts based on the Consensus Forecasts survey. These are month-end point forecasts with horizons of three and twelve months. They are the result of averaging the forecasts of the analytical

Chart 3 – Brent oil price forecast based on the CF

(USD/barrel)

Source: Consensus Economics
Note: Circle – 3month forecast, triangle – 12month forecast

and other institutions surveyed (around 60 respondents). The advantage is that the maximum and minimum estimates and the standard deviation of the distribution are available in addition to the average. The disadvantage is that if we want a smooth forecast curve we need to interpolate ad hoc, and the horizon is moreover limited to one year. These forecasts were originally for US WTI light crude oil (up until 2012). However, WTI price gradually ceased to be a global benchmark and was thus replaced with Brent.
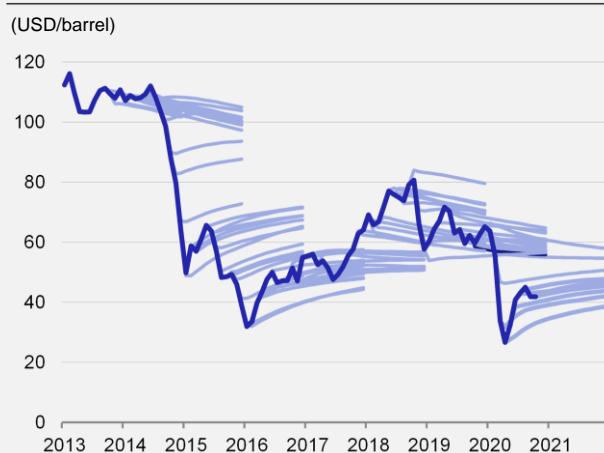
Chart 4 – Brent price forecasts from EIA STEO

(USD/barrel)
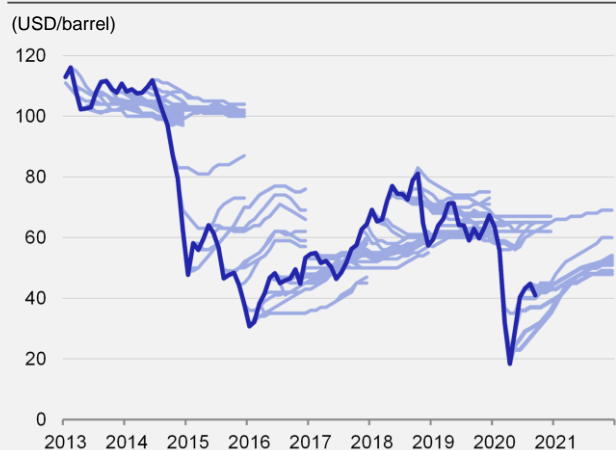
Source: EIA

Chart 5 – Brent price forecasts based on futures prices

(USD/barrel)

Source: ICE, Bloomberg, CNB

EIA forecasts (see Chart 4). We include these forecasts in our analysis because they are available regularly and free of charge and are intuitively consistent with expected global supply and demand. Although the forecast is for the spot price of Brent crude based on physical delivery in the North Sea (in the UK), the difference with respect to the nearest ICE futures contract is not usually significant. The forecast is a combination of model-based approaches, the results of which are adjusted by expert judgement based on current oil market dynamics (for more details, see EIA, 2020). It also takes into account the levels of, and outlook for, market fundamentals (especially global inventory levels and change therein). Global supply and demand forecasts are then derived from the expected oil price. However, these fundamentals in turn affect the price of oil, so the entire process is made up of iterations that generate an oil price forecast consistent with the evolution of other market fundamentals. As the chart shows, the resulting forecasts are not as smooth as those derived from the market futures curve. It will therefore be interesting to compare whether the above mechanism delivers better results.

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[5] Numerous long-term forecasts (often from renowned international institutions) are also regularly available. They have horizons of several decades and mostly involve average annual values, and the interval between the projected points is typically five or ten years. Such forecasts are of only limited use for our purposes and are thus not included in our selection.

Futures-based forecasts (see Chart 5). These forecasts have the advantage of being simple, transparent and easy to communicate. The disadvantage is that the futures curve has a flat profile which does not take into account the short-term dynamics of expected demand and supply, and has typically been downward sloping in the past (backwardation). This backwardation does not, however, express expectations of falling prices,[6] but, according to the theory of trade in physical storable commodities, reflects other factors. Assuming no arbitrage, as the delivery date becomes more distant, the price of oil should increase with the risk-free rate, the risk premium and storage costs. Only the convenience yield works in the opposite direction. This is the premium a buyer is willing to pay to own an asset physically and not just in the form of a futures contract with later delivery. Under normal market conditions, this premium then outweighs other factors and leads to the spot price being higher than futures prices. This motivates producers to produce and buyers to build up only modest operational inventories. It is only when traders perceive a surplus of oil on the market that the convenience yield decreases, and with it the spot price. The futures curve turns upward sloping ("contango"). It pays for producers to restrict oil production (and store oil underground) and for traders and buyers to buy cheap oil on the spot physical market, store it (in onshore tanks or offshore in tankers) and sell it at the same time in the form of futures contracts.

Naive random walk forecasts. The random walk model is one of the simplest theoretical processes that generates time series data. It assumes that in each period the variable of interest will undergo a change for which we know neither the direction nor the magnitude. The only requirement is that these changes are mutually independent random variables which all have the same probability distributions (i.e. they are independent and identically distributed, i.i.d.). It is therefore impossible to estimate these changes in advance. In this case, the naive forecast appears to be optimal. It assumes that the expected change at each point of the forecast is zero and the last known value of the variable is thus used over the entire forecast horizon. Naive forecasts are said to work surprisingly well for many economic and financial time series. However, this forecast should give the worst results, as in this case we consider changes in oil prices to be totally random. In Charts 1 and 2 the naive forecast would be a horizontal line based on the last known value at the time of the forecast.

Assessment of the point forecasts

Given that Consensus Forecasts only provides point forecasts for the three-month and one-year horizons, we will compare it with the other forecast sources at those points only. It should also be noted in advance that this comparison is not perfect, because the CF forecasts pertain to the end of the month, while the available monthly averages are used for the other forecasts. However, this should not be a source of systematic error. Nonetheless, the results presented in Tables 1 and 2 should be viewed as tentative.

Table 1 – Comparison of point forecasts for entire period

(USD/barrel)

Forecast	3M horizon		12M horizon	
	MFE	RMSE	MFE	RMSE
CF	3.08	9.74	12.60	20.14
Futures	3.18	9.22	11.62	19.29
EIA	2.24	10.52	12.25	20.60
Naive	3.31	10.22	10.69	21.06

Note: Average forecast for Oct 2013–Jun 2020 for three-month horizon;
average forecast for Oct 2016–Sep 2019 for twelve-month horizon

Table 2 – Comparison of forecasts for shortened time period

(USD/barrel)

Forecast	3M horizon		12M horizon	
	MFE	RMSE	MFE	RMSE
CF	-0.63	8.16	0.30	12.35
Futures	-0.05	7.97	0.02	12.21
EIA	-1.55	9.11	-0.61	12.76
Naive	-0.50	8.88	-1.18	14.88

Note: Average forecast for Jan 2016–Jun 2020 for three-month horizon;
average forecast for Jan 2016–Sep 2019 for twelve-month horizon

Table 1 summarises the results of the four different point forecasts for the two available horizons over the entire period under review. This period starts in October 2013, from which time we have a systematically constructed forecast of the price of Brent crude oil based on the market futures curve. The end of the period then depends on the last known forecast value and hence differs according to the forecast horizon. The accuracy of the forecasts is expressed by the root mean squared error (RMSE), which does not distinguish whether the deviation of the projection from the subsequent outcome was positive or negative. The table shows the average RMSE over the entire period. In addition to this criterion, we present the simple mean forecast error (MFE), which gives us an idea of the bias of the forecasts.

In terms of accuracy, futures-based forecasts perform best on average for the whole period under review and for both horizons. They show the lowest average RMSE, although the Consensus Forecasts outlooks are only slightly worse. By contrast, for the three-month horizon the EIA forecast does not even outperform the naive forecast.

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[6] For example, according to ECB (2015), forecasts derived from the market futures curve are only an imperfect reflection of analysts' expectations and perform quite well only in times of stable prices. However, although the ECB has its own oil price forecasting mechanism based on a combination of several models that is reportedly more robust to changes in oil price dynamics and produces lower forecast errors, the ECB's macroeconomic projections mostly use a forecast derived from the market futures curve as the baseline for oil price assumptions. The model-based forecast is used more to assess the risks of the forecast. In addition, it is not publicly available on a regular basis.

However, the errors of all the forecasts are significant on average. For example, expressed as a percentage of the subsequently realised values, the average error of the Consensus Forecasts predictions is 19% for the three-month horizon and 40% for the twelve-month horizon. That this is no accident is shown, for example, by Sainsbury (2017), who assessed the accuracy of WTI oil price predictions based on Wall Street Journal surveys conducted from mid-2007 to the end of 2016. The average error of these forecasts was 27% for the six-month horizon and 30% for the twelve-month horizon.

For the entire period under review, it can also be concluded that none of the forecasts was unbiased on average and they all significantly overestimated the subsequent realised price based on the MFE. However, this is mainly due to an unexpected sharp fall in the price of oil that occurred from mid-2014 to the end of 2015. We therefore made a similar comparison for a shortened period from January 2016 to the present. This is summarised in Table 2.

In terms of the accuracy of the individual forecasts, the conclusions for the shortened period are the same. However, the shortened period symmetrically covers a period of rising and falling oil prices. As a result, the bias of all the forecasts is significantly improved based on the MFE. The accuracy of all forecasts is also better, especially at the twelve-month horizon. However, it still holds that the futures-based forecast shows the highest level of accuracy (and now also lowest bias) even in the shortened period. The Consensus Forecasts prediction remains in second place.

Assessment of the continuous forecasts

The other three forecast sources besides Consensus Forecasts provide an entire path of expected values. In the following text we will assess these continuous forecasts. The longest possible rolling period for EIA forecasts is 13 months,[7] so we perform the comparison for this forecast length. Again, we will use the RMSE to assess the accuracy of the forecasts. Chart 6 presents the development of the RMSE criterion in time (based on forecast origination) for the different forecast sources. The chart shows that the three types of forecast have similar error profiles and that the errors are again quite large. Although the EIA's model-based forecast looks more sophisticated at first glance (see Chart 4), in most cases the futures-based forecast has a smaller absolute deviation from the subsequent outcome, and in the minority of cases where the EIA forecast is more accurate the difference is not too big. This is demonstrated by the average RMSEs for the two periods under review, shown in Table 3.
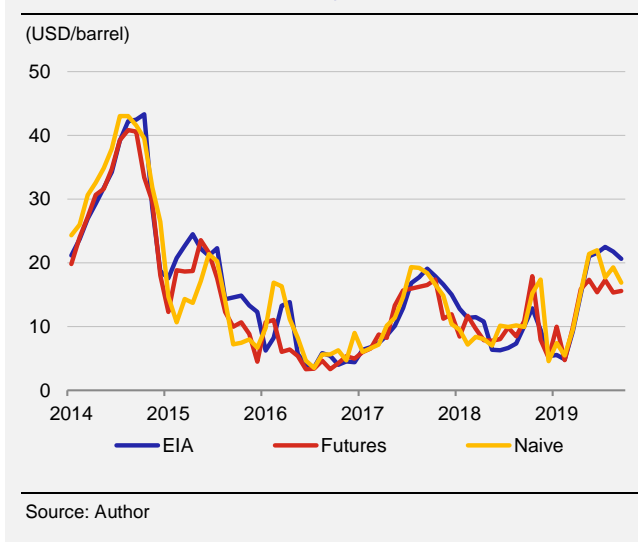
Chart 6 – Forecast accuracy based on RMSE

(USD/barrel)

Source: Author

Table 3 – Comparison of point forecasts for entire period

(USD/barrel)

Forecast	RMSE	
	2013-2019	2016-2019
Futures	14.21	9.75
EIA	15.51	10.83
Naive	15.43	11.31

Note: Average forecast for Oct 2013/Jan 2016–Sep 2019

The continuous futures-based forecast therefore also performs better than the EIA continuous forecast. If we add to this the above advantages of simplicity, transparency and ease of communication, it is logical that this type of forecast continues to play an important role and enters many macroeconomic models as one of the assumptions made about the evolution of the external environment.

Conclusion

As shown above, the accuracy of the Brent crude oil price forecasts we consider is quite low. This is because, in addition to fundamentals, which can be predicted to some extent, the price of oil is affected by a large number of non-market factors whose effect and sometimes even existence cannot be estimated or forecasted (for example, the political situation in the Middle East, trade wars, the shale gas revolution in the USA and the related changes to OPEC's strategy and, most recently, the outbreak of the COVID-19 pandemic). Whether the oil price forecasts are derived from futures-based market outlooks, on the basis of models, or by averaging individual institutions' forecasts, their accuracy does not differ much over the horizon under review.

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[7] The EIA forecast horizon shifts once a year

Although a large number of theoretical studies criticise the use of the market futures curve for the preparation of oil price forecasts, our results justify this approach to some extent. Besides the fact that the futures-based forecast shows at least the same level of accuracy[8] as its competitors, it has significant advantages over them:

- First and foremost, it is simple, transparent and easy to communicate.
- Unlike the Consensus Forecasts point forecasts, it gives a clear path of values for the selected horizon.
- While the EIA's model-based forecast has a variable horizon of 13–24 months, the futures curve makes it easy to generate a continuous forecast with a length of about five years.
- The EIA forecast is for the physical price of Brent crude oil on the spot market (dated Brent). Although the difference with respect to the price of the nearest futures contract on the commodity exchange is not generally large, prices of standardised futures have the advantages of greater availability in real time and transparency.

So, although futures-based oil price forecasts may not accurately reflect analysts' expectations regarding the future path of oil prices, they continue to play an important role in practice. This is evidenced, among other things, by the fact that these forecasts enter many institutions' macroeconomic forecasts as one of the assumptions made about the evolution of the external environment, even though these institutions also have their own theoretical model-based oil price forecasts (see, for example, ECB, 2015).

Nonetheless, model-based forecasts (and especially combinations thereof) play an important role in the practical decision-making of various economic agents as well. Progress is still being made in the development of models for forecasting oil prices, and it is important to continue monitoring and comparing the results of the individual approaches. If models learn to better account for changing price dynamics (due, for example, to the "financialisation" of the oil market, i.e. the increasing use of oil as a financial asset) and to better distinguish the origins of incoming shocks affecting oil prices, these models may provide increasingly useful information, especially when a combination of models is used. In addition, the model-based approach plays an important role in the assessment of risks arising in different areas of the economy, as it allows alternative scenarios to be created and compared with the baseline scenario forecast. This is important both for businesses and for monetary and fiscal policy-makers.

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[8] There are methods and test statistics that can be used to determine whether alternative forecasts are equivalent or whether some of them give significantly better results statistically. However, such an analysis is beyond the scope of this article.

A1. Change in predictions for 2021

GDP growth, %

	CF			IMF			OECD			CB / EIU		
EA	-0.1	2021/3	2021/2	-1.0	2021/1	2020/10	+0.3	2021/3	2020/12	+0.2	2020/3	2020/12
US	+1.0	2021/3	2021/2	+2.0	2021/1	2020/10	+3.3	2021/3	2020/12	+0.2	2020/12	2020/9
UK	+0.4	2021/3	2021/2	-1.4	2021/1	2020/10	+0.9	2021/3	2020/12	-2.3	2021/2	2020/11
JP	+0.5	2021/3	2021/2	+0.8	2021/1	2020/10	+0.4	2021/3	2020/12	+0.3	2021/1	2020/10
CN	0	2021/3	2021/2	-0.1	2021/1	2020/10	-0.2	2021/3	2020/12	-0.2	2021/3	2021/1
RU	+0.1	2021/2	2021/1	+0.2	2021/1	2020/10	-0.1	2021/3	2020/12	-0.3	2021/2	2021/1

Inflation, %

	CF			IMF			OECD			CB / EIU		
EA	+0.3	2021/3	2021/2	-0.1	2020/10	2020/4	+0.2	2020/12	2020/6	+0.2	2020/3	2020/12
US	+0.1	2021/3	2021/2	+0.6	2020/10	2020/4	+0.4	2020/12	2020/6	+0.1	2020/12	2020/9
UK	+0.1	2021/3	2021/2	-0.3	2020/10	2020/4	+0.1	2020/12	2020/6	0	2021/2	2020/11
JP	+0.1	2021/3	2021/2	-0.1	2020/10	2020/4	+0.3	2020/12	2020/6	+0.1	2021/1	2020/10
CN	+0.1	2021/3	2021/2	+0.1	2020/10	2020/4	+0.4	2020/12	2020/6	+0.1	2021/3	2021/1
RU	+0.2	2021/2	2021/1	+0.2	2020/10	2020/4	+0.1	2020/12	2020/6	0	2021/2	2021/1

A2. Change in predictions for 2022

GDP growth, %

	CF			IMF			OECD			CB / EIU		
EA	+0.1	2021/3	2021/2	+0.5	2021/1	2020/10	+0.5	2021/3	2020/12	-2.1	2020/3	2020/12
US	+0.4	2021/3	2021/2	-0.4	2021/1	2020/10	+0.5	2021/3	2020/12	+0.2	2020/12	2020/9
UK	+0.2	2021/3	2021/2	+1.8	2021/1	2020/10	+0.6	2021/3	2020/12	+1.0	2021/2	2020/11
JP	0	2021/3	2021/2	+0.7	2021/1	2020/10	+0.3	2021/3	2020/12	+0.2	2021/1	2020/10
CN	-0.1	2021/3	2021/2	-0.2	2021/1	2020/10	0	2021/3	2020/12	0	2021/3	2021/1
RU	-0.2	2021/2	2021/1	+1.6	2021/1	2020/10	+0.4	2021/3	2020/12	+0.3	2021/2	2021/1

Inflation, %

	CF			IMF			OECD			CB / EIU		
EA	+0.1	2021/3	2021/2	---	2020/10		---	2020/12		+0.3	2020/3	2020/12
US	0	2021/3	2021/2	---	2020/10		---	2020/12		+0.1	2020/12	2020/9
UK	0	2021/3	2021/2	---	2020/10		---	2020/12		+0.3	2021/2	2020/11
JP	+0.1	2021/3	2021/2	---	2020/10		---	2020/12		0	2021/1	2020/10
CN	+0.4	2021/3	2021/2	---	2020/10		---	2020/12		+1.0	2021/3	2021/1
RU	0	2021/2	2021/1	---	2020/10		---	2020/12		0	2021/2	2021/1

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

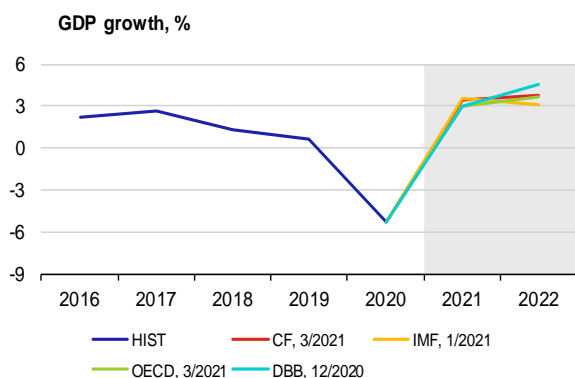GDP growth in the euro area countries in 2021 and 2022, %
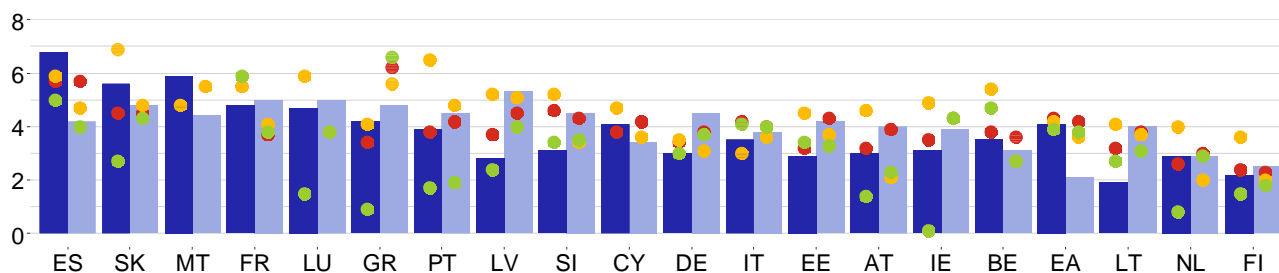
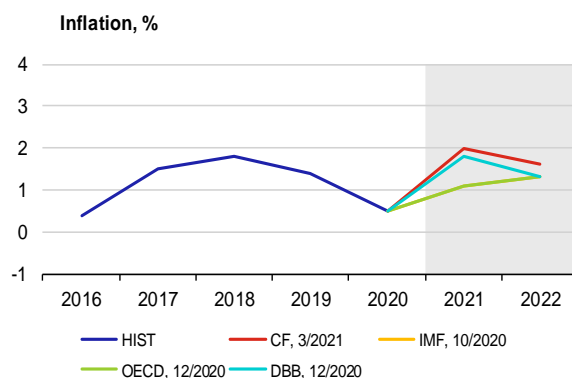Inflation in the euro area countries in 2021 and 2022, %

● CF ● IMF ● OECD ■ ECB 2021 ■ ECB 2022
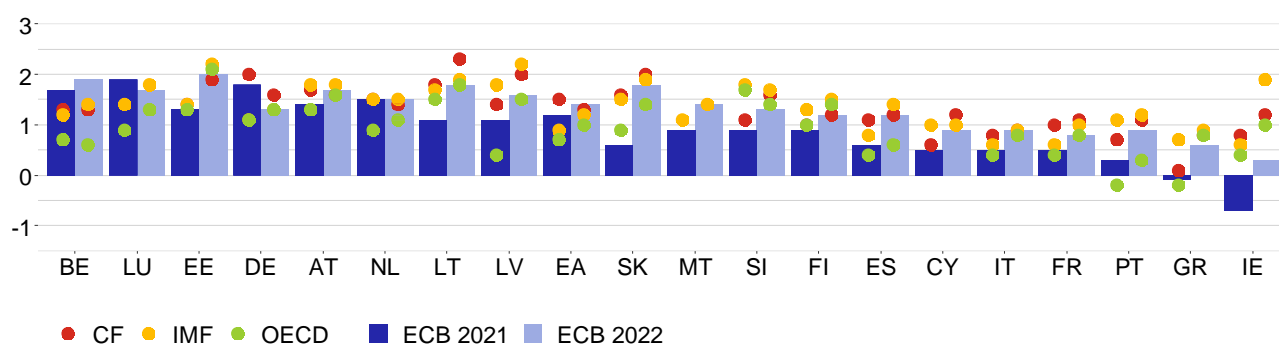
Note: Charts show institutions' latest available outlooks of for the given country.

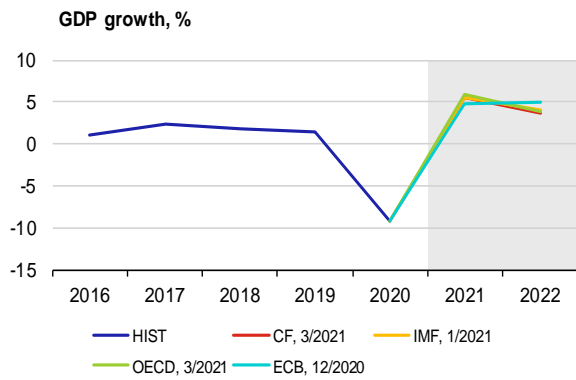## A4. GDP growth and inflation in the individual euro area countries

Germany

GDP growth, %

HIST   CF, 3/2021   IMF, 1/2021
OECD, 3/2021   DBB, 12/2020

	CF		IMF	OECD		DBB
2021	3.4	↘	3.5	3.0	↗	3.0
2022	3.8	→	3.1	3.7	↘	4.5

Inflation, %

HIST   CF, 3/2021   IMF, 10/2020
OECD, 12/2020   DBB, 12/2020

	CF		IMF	OECD	DBB
2021	2.0	↗	1.1	1.1	1.8
2022	1.6	→	1.3	1.3	1.3

France

GDP growth, %

Legend: HIST | CF, 3/2021 | IMF, 1/2021 | OECD, 3/2021 | ECB, 12/2020

	CF		IMF	OECD	ECB
2021	5.5	→	5.5	5.9	4.8
2022	3.7	↗	4.1	3.8	5.0

Inflation, %

Legend: HIST | CF, 3/2021 | IMF, 10/2020 | OECD, 12/2020 | ECB, 12/2020
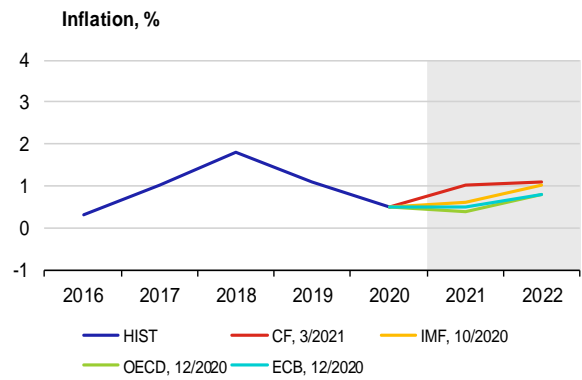
	CF		IMF	OECD	ECB
2021	1.0	↗	0.6	0.4	0.5
2022	1.1	→	1.0	0.8	0.8

Italy

GDP growth, %

Legend: HIST | CF, 3/2021 | IMF, 1/2021 | OECD, 3/2021 | ECB, 12/2020
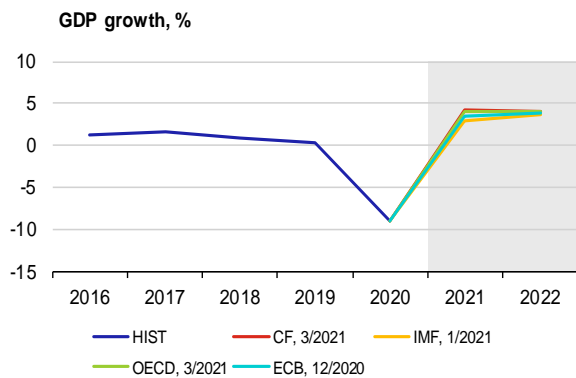
	CF		IMF	OECD	ECB
2021	4.2	↘	3.0	4.1	3.5
2022	4.0	↗	3.6	4.0	3.8

Inflation, %

Legend: HIST | CF, 3/2021 | IMF, 10/2020 | OECD, 12/2020 | ECB, 12/2020
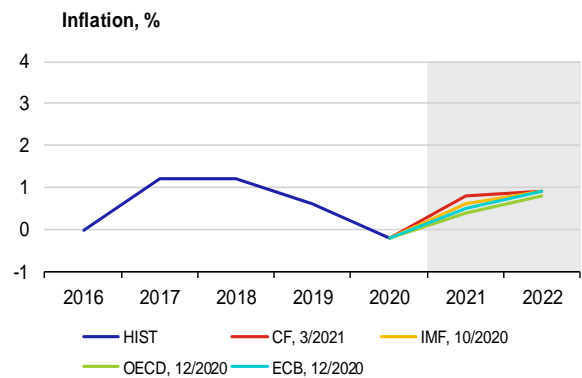
	CF		IMF	OECD	ECB
2021	0.8	↗	0.6	0.4	0.5
2022	0.9	→	0.9	0.8	0.9

Spain

GDP growth, %

Legend: HIST | CF, 3/2021 | IMF, 1/2021 | OECD, 12/2020 | ECB, 12/2020
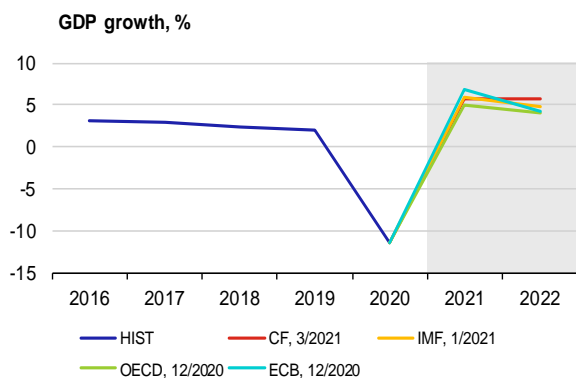
	CF		IMF	OECD	ECB
2021	5.7	→	5.9	5.0	6.8
2022	5.7	→	4.7	4.0	4.2

Inflation, %

Legend: HIST | CF, 3/2021 | IMF, 10/2020 | OECD, 12/2020 | ECB, 12/2020
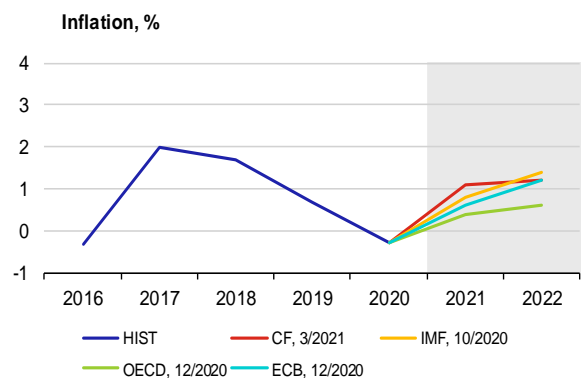
	CF		IMF	OECD	ECB
2021	1.1	↗	0.8	0.4	0.6
2022	1.2	→	1.4	0.6	1.2

Netherlands

GDP growth, %

	CF		IMF	OECD	ECB
2021	2.6	↗	4.0	0.8	2.9
2022	3.0	→	2.0	2.9	2.9

Inflation, %

	CF		IMF	OECD	ECB
2021	1.5	↗	1.5	0.9	1.5
2022	1.4	→	1.5	1.1	1.5

Belgium

GDP growth, %

	CF		IMF	OECD	ECB
2021	3.8	↘	5.4	4.7	3.5
2022	3.6	→	2.7	2.7	3.1

Inflation, %

	CF		IMF	OECD	ECB
2021	1.3	↗	1.2	0.7	1.7
2022	1.3	→	1.4	0.6	1.9

Austria

GDP growth, %

	CF		IMF	OECD	ECB
2021	3.2	↗	4.6	1.4	3.0
2022	3.9	↗	2.1	2.3	4.0

Inflation, %

	CF		IMF	OECD	ECB
2021	1.7	↗	1.8	1.3	1.4
2022	1.6	→	1.8	1.6	1.7

Ireland

GDP growth, %
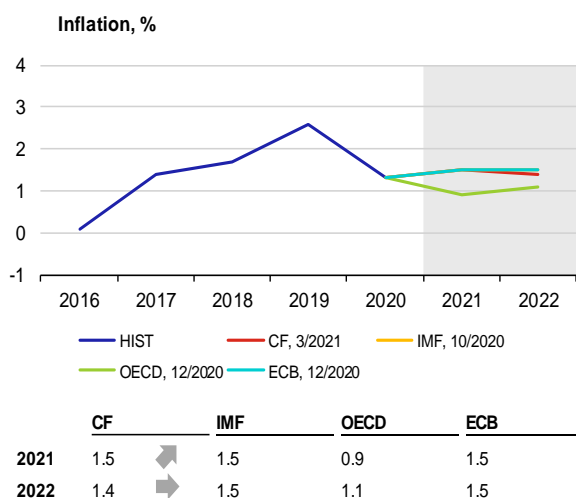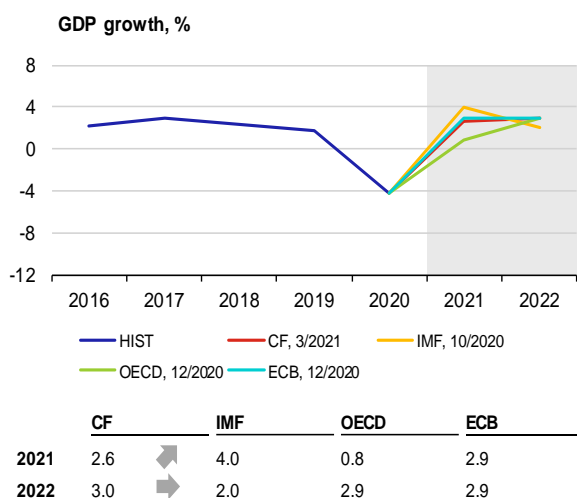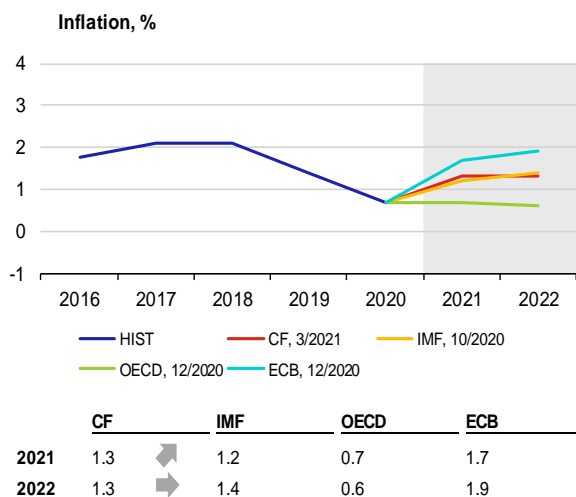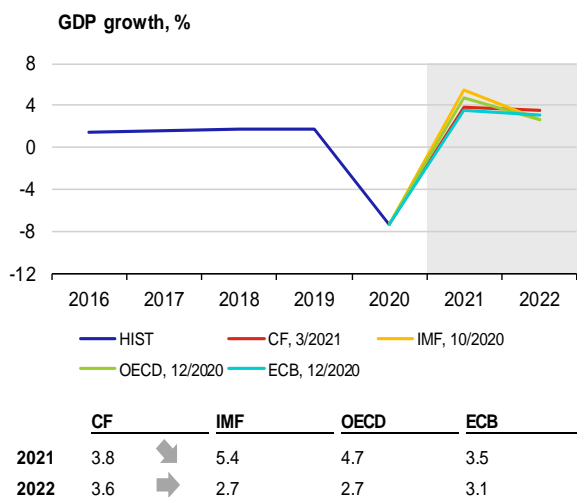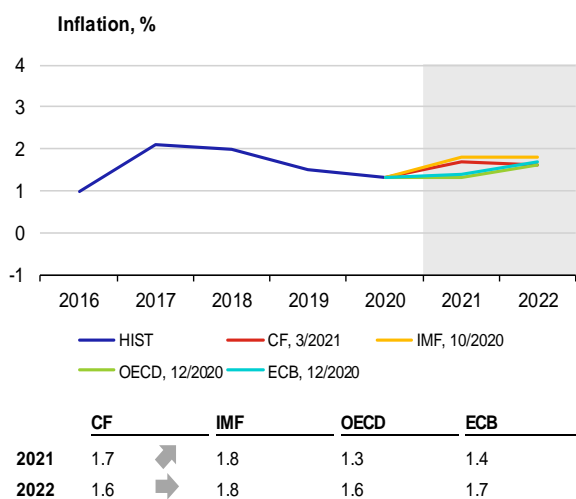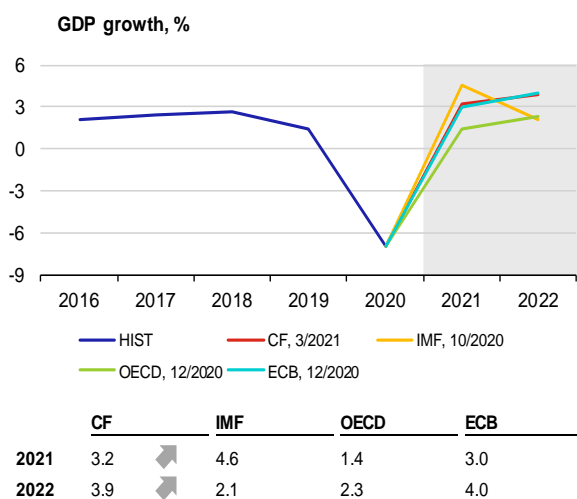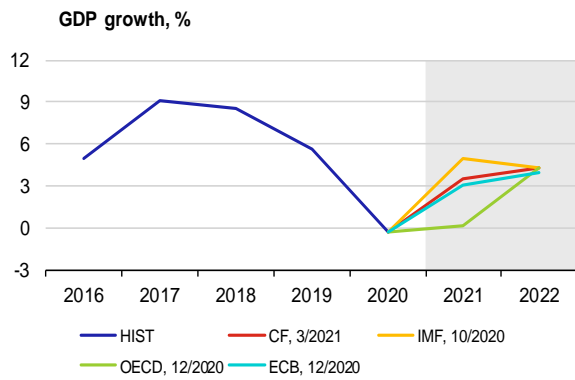
	CF		IMF	OECD	ECB
2021	3.5	↗	4.9	0.1	3.1
2022	4.3	↗	4.3	4.3	3.9

Inflation, %
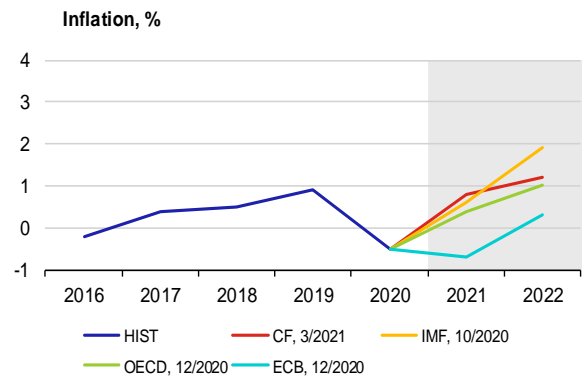
	CF		IMF	OECD	ECB
2021	0.8	↗	0.6	0.4	-0.7
2022	1.2	↘	1.9	1.0	0.3

Finland

GDP growth, %
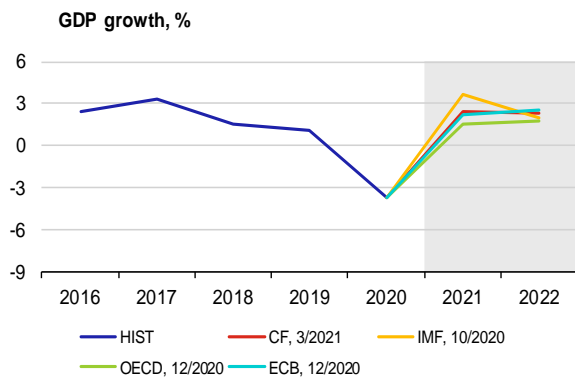
	CF		IMF	OECD	ECB
2021	2.4	→	3.6	1.5	2.2
2022	2.3	→	2.0	1.8	2.5

Inflation, %
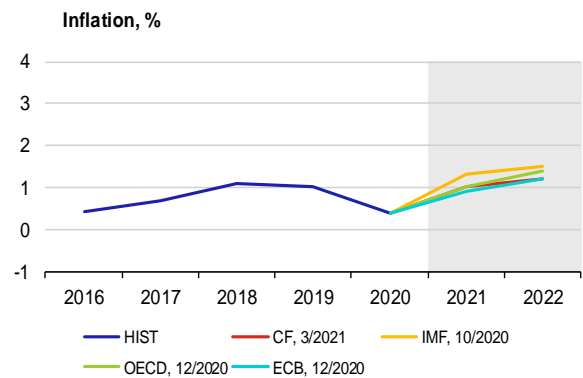
	CF		IMF	OECD	ECB
2021	1.0	→	1.3	1.0	0.9
2022	1.2	→	1.5	1.4	1.2

Portugal

GDP growth, %
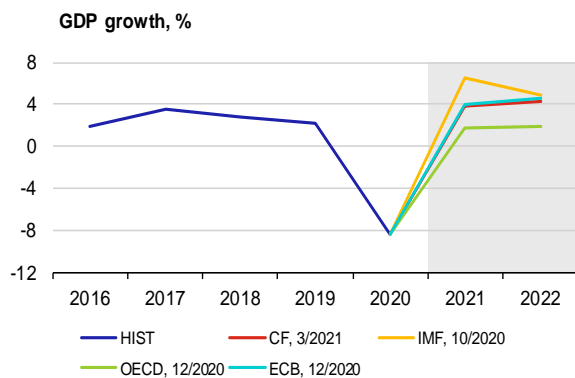
	CF		IMF	OECD	ECB
2021	3.8	→	6.5	1.7	3.9
2022	4.2	↘	4.8	1.9	4.5

Inflation, %
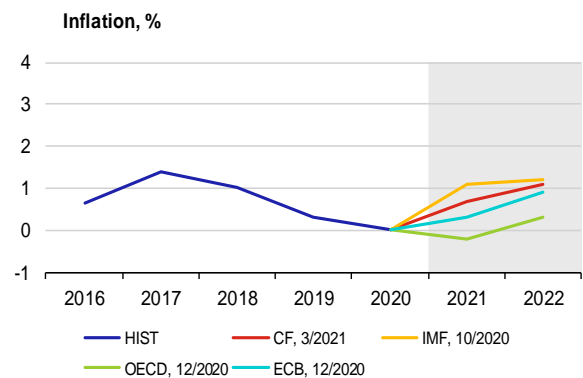
	CF		IMF	OECD	ECB
2021	0.7	↗	1.1	-0.2	0.3
2022	1.1	↗	1.2	0.3	0.9

Greece

GDP growth, %

Inflation, %
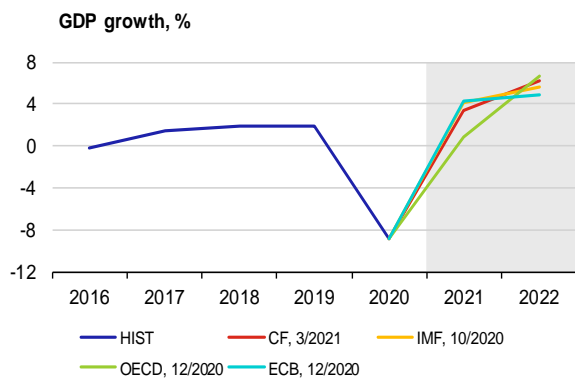
	CF		IMF	OECD	ECB
2021	3.4	↘	4.1	0.9	4.2
2022	6.2	→	5.6	6.6	4.8
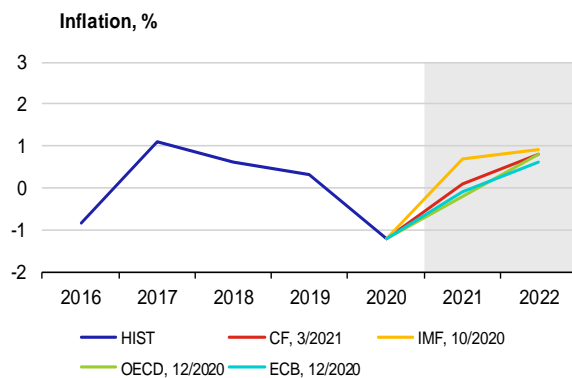
	CF		IMF	OECD	ECB
2021	0.1	↘	0.7	-0.2	-0.1
2022	0.8	→	0.9	0.8	0.6

Slovakia

GDP growth, %

Inflation, %
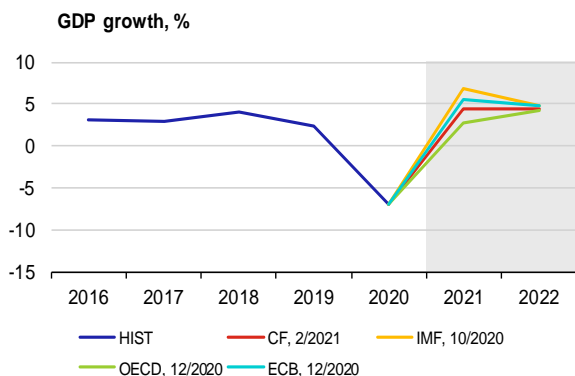
	CF		IMF	OECD	ECB
2021	4.5	↘	6.9	2.7	5.6
2022	4.5	↗	4.8	4.3	4.8
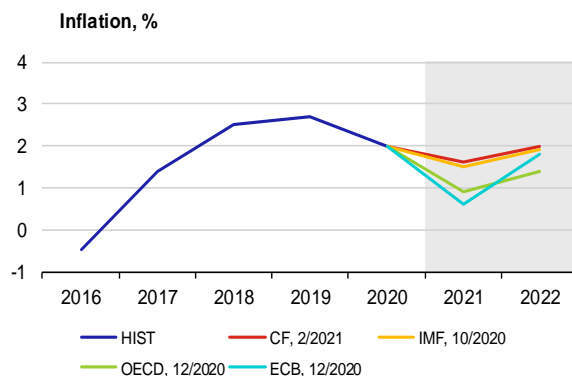
	CF		IMF	OECD	ECB
2021	1.6	→	1.5	0.9	0.6
2022	2.0	↗	1.9	1.4	1.8

Luxembourg

GDP growth, %

Inflation, %
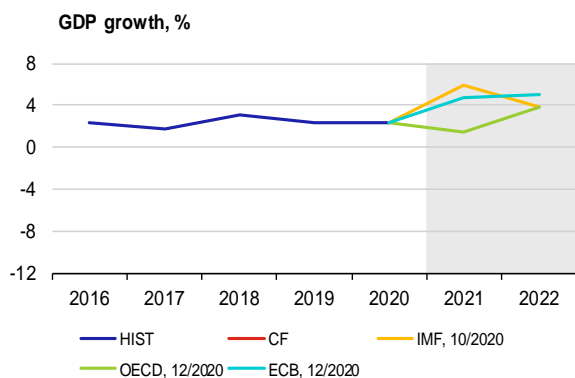
	CF	IMF	OECD	ECB
2021	n. a.	5.9	1.5	4.7
2022	n. a.	3.8	3.8	5.0
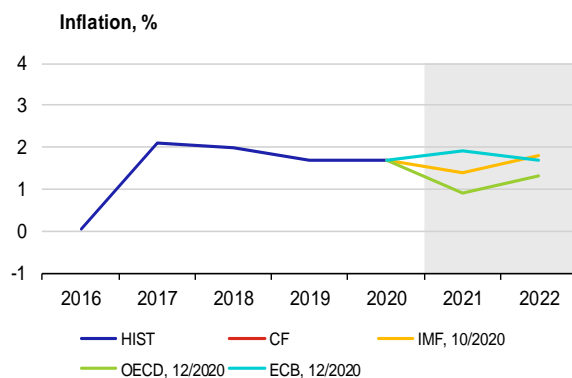
	CF	IMF	OECD	ECB
2021	n. a.	1.4	0.9	1.9
2022	n. a.	1.8	1.3	1.7

Slovenia

GDP growth, %
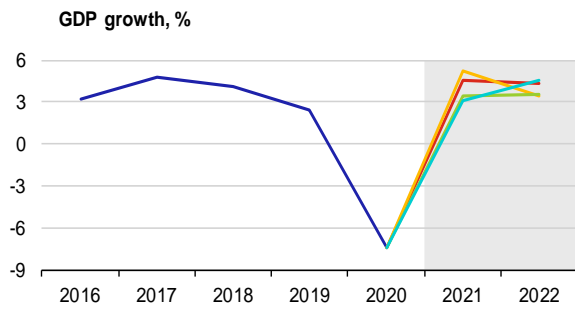
	CF		IMF	OECD	ECB
2021	4.6	↘	5.2	3.4	3.1
2022	4.3	↗	3.4	3.5	4.5

Inflation, %
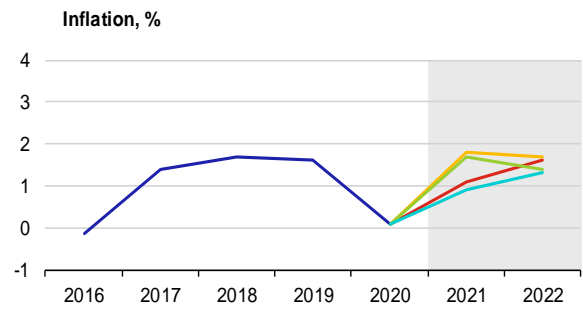
	CF		IMF	OECD	ECB
2021	1.1	→	1.8	1.7	0.9
2022	1.6	↗	1.7	1.4	1.3

Lithuania

GDP growth, %
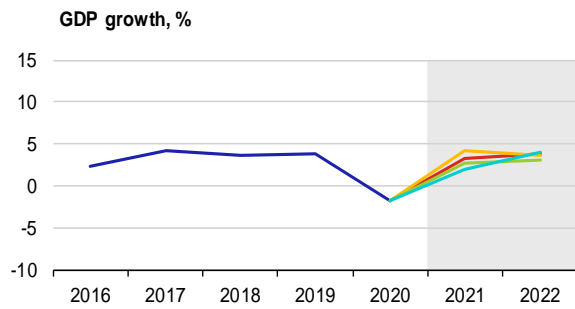
	CF		IMF	OECD	ECB
2021	3.2	↘	4.1	2.7	1.9
2022	3.8	↗	3.7	3.1	4.0

Inflation, %
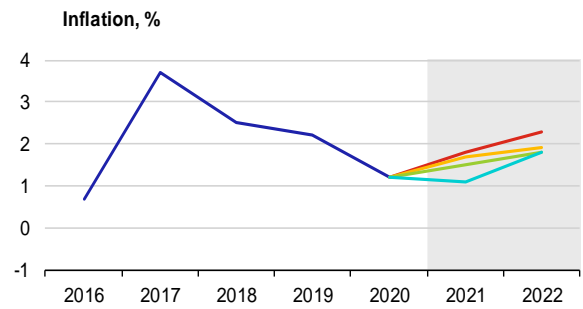
	CF		IMF	OECD	ECB
2021	1.8	→	1.7	1.5	1.1
2022	2.3	↗	1.9	1.8	1.8

Latvia

GDP growth, %
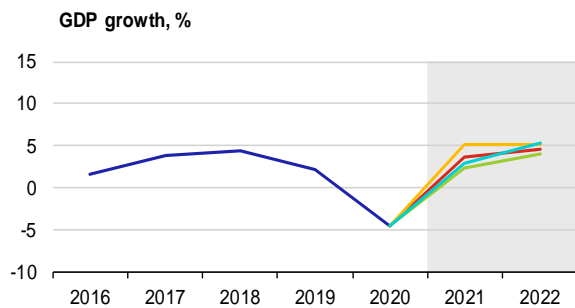
	CF		IMF	OECD	ECB
2021	3.7	→	5.2	2.4	2.8
2022	4.5	→	5.1	4.0	5.3

Inflation, %
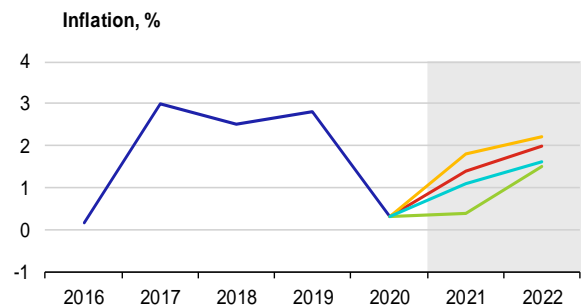
	CF		IMF	OECD	ECB
2021	1.4	↗	1.8	0.4	1.1
2022	2.0	↘	2.2	1.5	1.6

Estonia

GDP growth, %
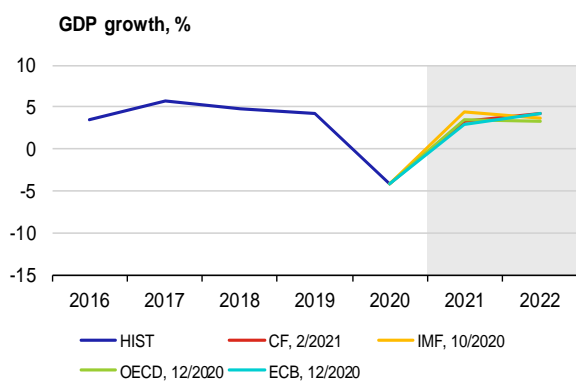
	CF		IMF	OECD	ECB
2021	3.2	↘	4.5	3.4	2.9
2022	4.3	↗	3.7	3.3	4.2

Inflation, %
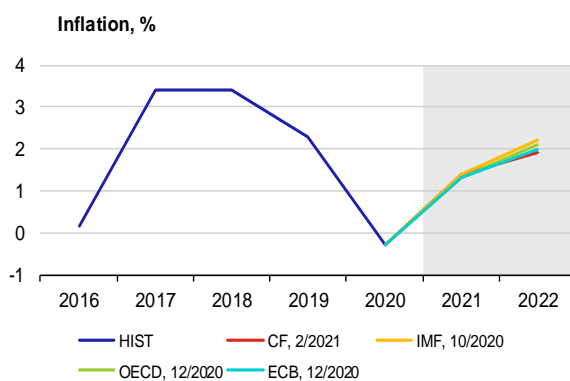
	CF		IMF	OECD	ECB
2021	1.4	↗	1.4	1.3	1.3
2022	1.9	→	2.2	2.1	2.0

Cyprus
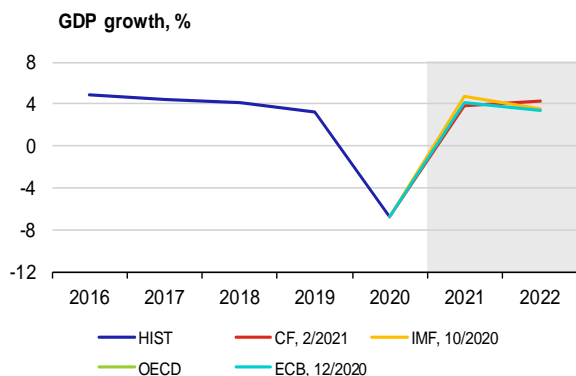
GDP growth, %

	CF		IMF	OECD	ECB
2021	3.8	↘	4.7	n. a.	4.1
2022	4.2	→	3.6	n. a.	3.4
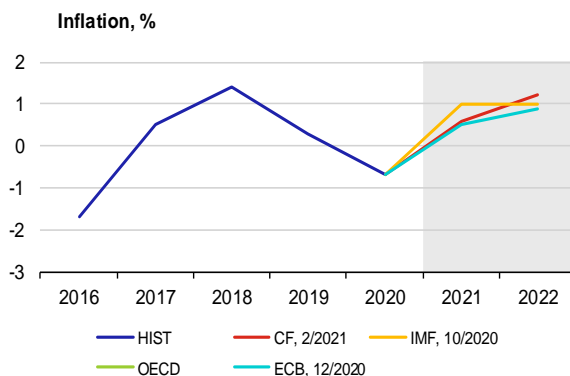
Inflation, %

	CF		IMF	OECD	ECB
2021	0.6	→	1.0	n. a.	0.5
2022	1.2	→	1.0	n. a.	0.9

Malta
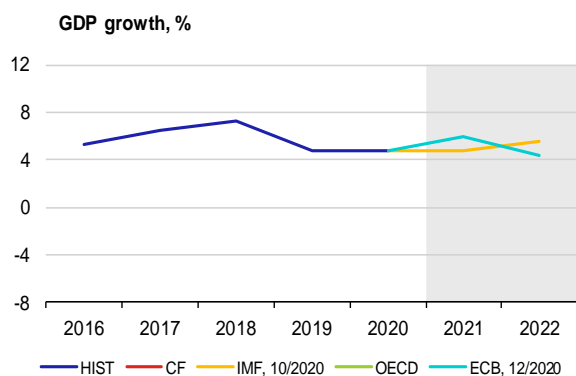
GDP growth, %

	CF	IMF	OECD	ECB
2021	n. a.	4.8	n. a.	5.9
2022	n. a.	5.5	n. a.	4.4
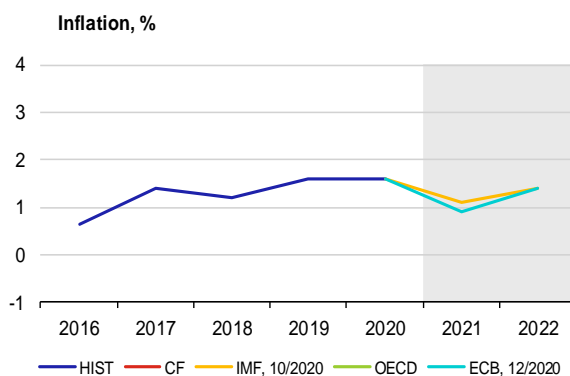
Inflation, %

	CF	IMF	OECD	ECB
2021	n. a.	1.1	n. a.	0.9
2022	n. a.	1.4	n. a.	1.4

Ddd

A5. GDP growth and inflation in other selected countries

Poland

GDP growth, %

Inflation, %

	CF		IMF	OECD	EIU	
2021	3.9	↘	2.7	2.9	3.9	↗
2022	4.7	↗	5.1	3.8	4.2	↗

	CF		IMF	OECD	EIU	
2021	2.4	↗	2.3	2.3	2.4	→
2022	2.5	↘	1.9	2.6	2.8	→

Hungary

GDP growth, %

Inflation, %

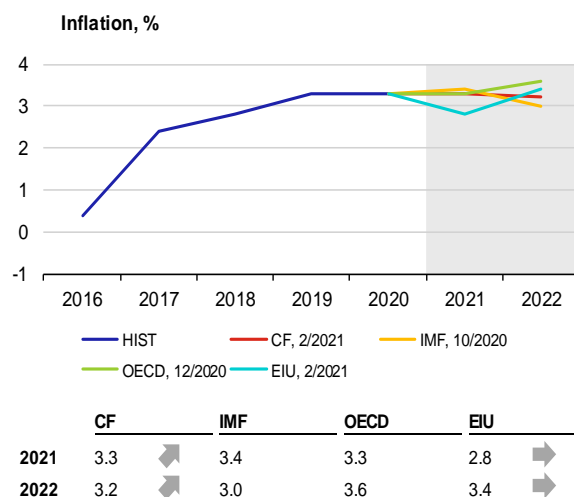|	CF		IMF	OECD	EIU	
2021	4.4	→	3.9	2.6	4.6	↗
2022	4.9	↗	4.0	3.4	4.0	↘

	CF		IMF	OECD	EIU	
2021	3.3	↗	3.4	3.3	2.8	→
2022	3.2	↗	3.0	3.6	3.4	→

Romania

GDP growth, %

Inflation, %

	CF		IMF	OECD	EIU	
2021	4.1	↗	4.6	2.0	3.9	→
2022	5.1	↗	3.9	4.4	4.9	→

	CF		IMF	OECD	EIU	
2021	2.7	↗	2.5	2.2	3.4	↗
2022	2.8	→	2.7	2.1	2.9	↘
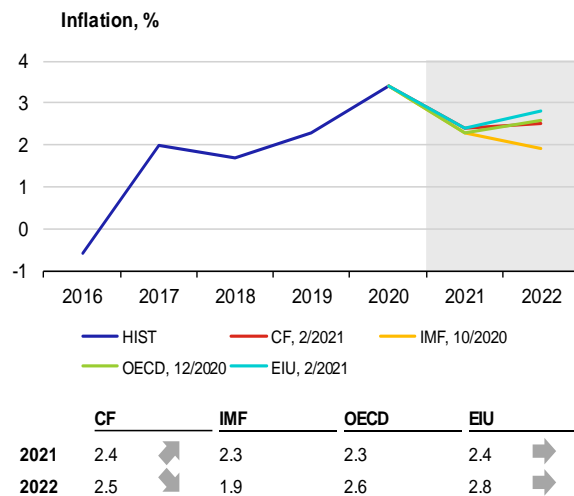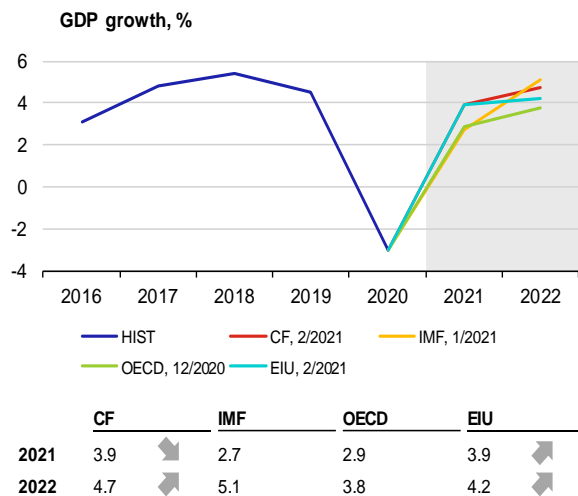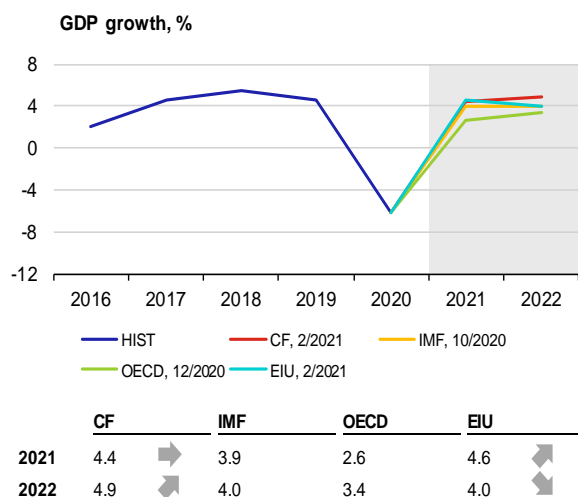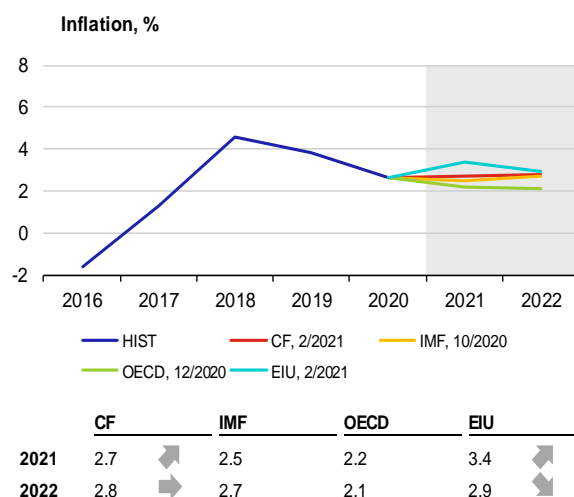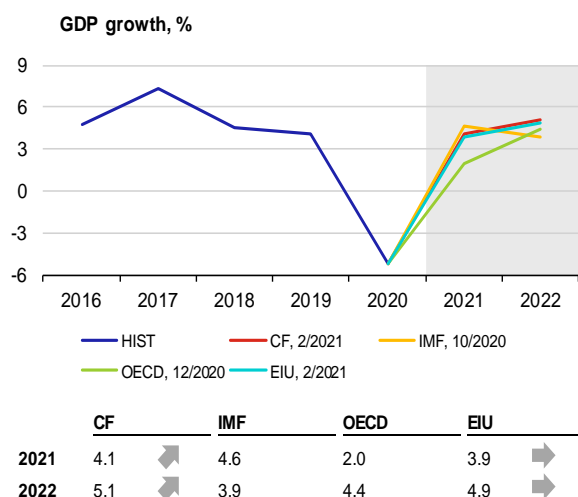
A6. List of abbreviations

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

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