

Global Economic Outlook

———— May 2021



Contents

I. Introduction	2
II. Economic outlook in selected territories	3
II.1 Euro area	3
II.2 United States	5
II.3 United Kingdom	6
II.4 Japan	6
II.5 China	7
II.6 Russia	7
II.7 India	8
III. Leading indicators and outlook of exchange rates	9
IV. Commodity market developments	10
IV.1 Oil	10
IV.2 Other commodities	11
V. Focus...	12
Assessment of the impacts of the pandemic on the world's major economies: A crisis of supply or demand?	12
A. Annexes	22
A1. Change in predictions for 2021	22
A2. Change in predictions for 2022	22
A3. GDP growth and inflation outlooks in the euro area countries	23
A4. GDP growth and inflation in the individual euro area countries	23
A5. GDP growth and inflation in other selected countries	30
A6. List of abbreviations	31

Cut-off date for data

14 May 2021

CF survey date

10 May 2021

GEO publication date

21 May 2021

Notes to charts

ECB, Fed, BoE and BoJ: midpoint of the range of forecasts.

The arrows in the GDP and inflation outlooks indicate the direction of revisions compared to the last GEO. If no arrow is shown, no new forecast is available. Asterisks indicate first published forecasts for given year. Historical data are taken from CF, with exception of MT and LU, for which they come from EIU.

Leading indicators are taken from Bloomberg and Refinitiv Datastream.

Forecasts for EURIBOR and LIBOR rates are based on implied rates from interbank market yield curve (FRA rates are used from 4M to 15M and adjusted IRS rates for longer horizons). Forecasts for German and US government bond yields (10Y Bund and 10Y Treasury) are taken from CF.

Contact

gev@cnb.cz

Authors

Luboš Komárek	Editor-in-chief, I. Introduction
Petr Polák	Editor, II.2 United States, II.7 India
Soňa Benecká	II.1 Euro area
Michaela Ryšavá	II.3 United Kingdom
Martin Kábrt	II.4 Japan
Martin Motl	II.5 China, V. Focus
Oxana Babecká	II.6 Russia
Jan Hošek	IV.1 Oil, IV.2 Other commodities
Jan Brůha	V. Focus
Jaromír Tonner	V. Focus

I. Introduction

Is another Covid-19 wave definitely over? It may seem so from the perspective of a (Central) European observer. Nevertheless, the situation remains critical, especially in developing countries, where dangerous mutations of the virus continue to spread. Take, for example, the adverse developments in [India](#), which we will cover in greater detail later in this issue of GEO. Of course, the connection between monetary policy settings and the epidemic situation can still be observed in central banking. The ECB communicated through several of its representatives its intention to maintain accommodative monetary policy until at least 70% of the European population are fully vaccinated. Reaching this threshold should stimulate

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

GDP	EA	DE	US	UK	JP	CN	RU
2021	4.2 →	3.3 →	6.6 ↗	6.0 ↗	2.8 →	8.7 →	3.1 ↗
2022	4.3 →	4.1 →	4.2 ↗	5.4 ↘	2.6 ↗	5.6 ↗	2.7 ↗
Inflation	EA	DE	US	UK	JP	CN	RU
2021	1.7 ↗	2.2 ↗	2.8 ↗	1.6 →	0.0 →	1.5 →	4.6 ↗
2022	1.3 →	1.6 →	2.3 →	2.2 ↗	0.5 →	2.2 →	4.1 ↗

Source: Consensus Forecasts (CF)

Note: Arrow indicates direction of revision of newly published forecast compared to the previous GEO.

United States, besides increasing vaccination coverage and the improving parameters of the real economy, rising inflation could also lead to a restrictive monetary policy by the Fed. The recent levels of inflation were unexpectedly high. But Fed officials perceive the current fast growth in the price level as rather temporary.

According to CF analysts, the **May GDP growth outlooks** did not drop for any of the countries under review for this year compared to the April outlook. Expected growth was revised downwards only for the United Kingdom in 2022. The spring relaxation of measures and continued positive sentiment were thus also reflected in growth expectations. Positive sentiment is also suggested by leading indicators, which are at a record high in all economies under review.

Outlooks for consumer inflation were again revised generally upwards compared to April. This is in line with our previous expectations of further growth in the outlooks dealt with in [last month's](#) issue. Following several years of low inflation, the situation is gradually reversing and inflation in some countries is visibly rising above the notional 2% ideal.

According to the May CF, the **US dollar** will weaken slightly against all the monitored currencies at the one-year horizon. A more pronounced weakening can be expected against the rouble. The CF outlook for the **Brent crude oil price** at the one-year horizon increased slightly compared to April, to USD 64/bbl (highest estimate USD 75/bbl, lowest estimate USD 53/bbl).

The **outlook for 3M USD LIBOR market rates** is now showing signs of growth, while that for 3M EURIBOR rates remains at the current negative levels with an indication of negligible growth in late 2022.

The **chart in the current issue** shows wood prices on commodity markets. The surge in the price of this currently scarce commodity, which is of key importance for residential construction in the USA, is one piece in the puzzle of inflation pressures that can be observed worldwide. This is not only about rising prices of non-energy commodities. Increasing prices in [international container transport](#) also have a big impact.

The current issue also contains an analysis [Assessment of the impacts of the pandemic on the world's major economies: a crisis of supply or demand?](#) The article analyses shocks caused by the coronavirus pandemic and compares it to the global financial crisis in the previous decade for the world's four largest advanced economies – the USA, the euro area, Japan and the United Kingdom. The authors conclude that the sharp economic downturn observed in 2020 mostly bears the hallmarks of a negative supply shock and is therefore stagflationary in nature.

debate on the start of monetary policy tightening in the euro area. The newly published European Commission's spring forecast increases the outlook for economic growth and inflation, which should support a more hawkish stance. The next ECB meeting (10 June), at which a decision is to be taken on the future of emergency purchases of government bonds, may become a litmus test for the start of monetary policy tightening in the euro area. In the

Wood prices over the last 10 years, USD/1,000 bf



Source: Nasdaq

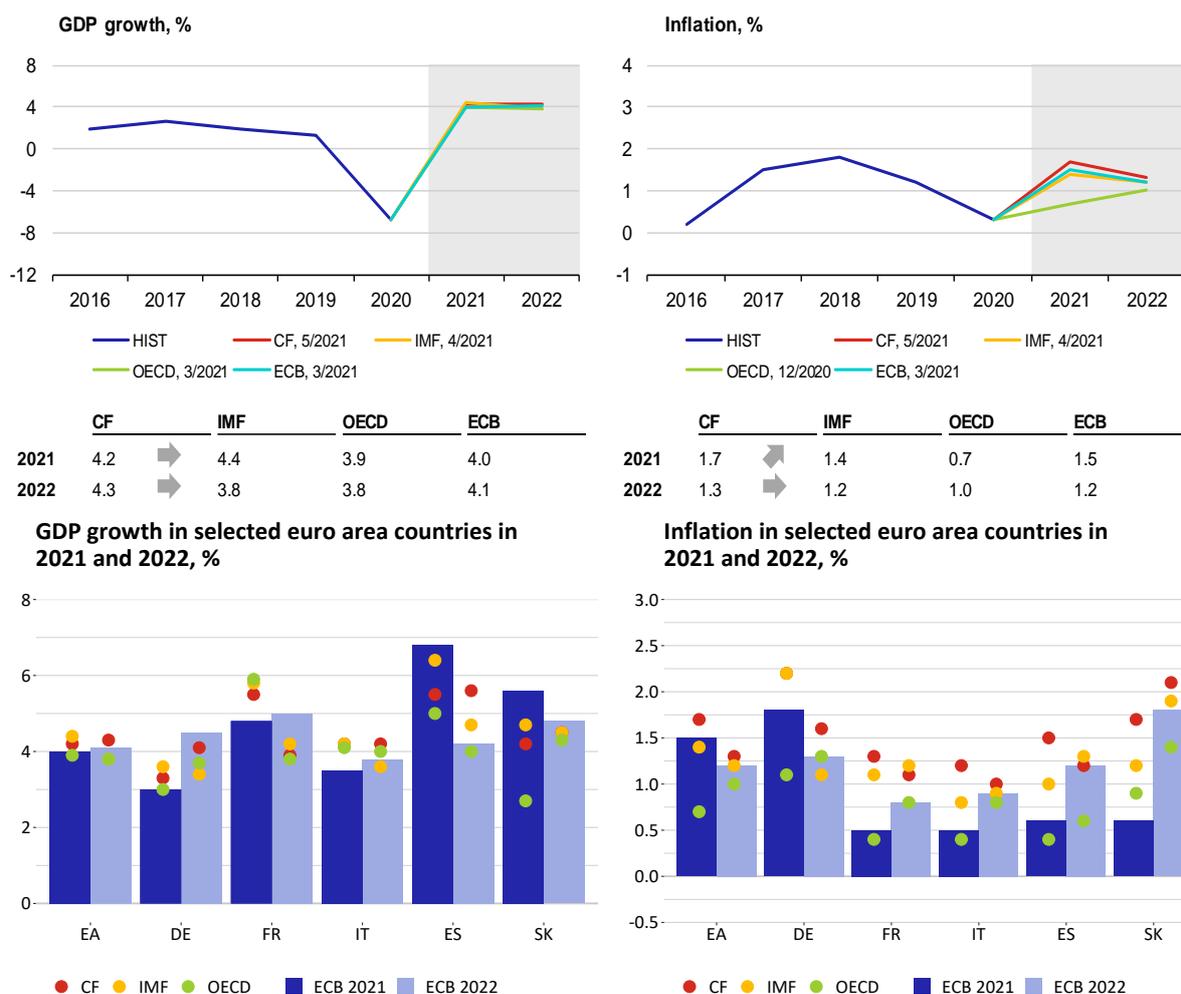
Note: bf – board foot; this unit is defined as a board equal to one square foot and one inch thick.

II.1 Euro area

A worse course of the pandemic and longer shutdowns in 2021 Q1 resulted in a decline in the euro area economy, albeit more moderate than expected. According to a preliminary estimate, the quarterly decline amounted to 0.6%, i.e. almost the same rate as in 2020 Q4. Activity in the euro area was thus almost 2% lower than last year. According to the available information, the largest quarterly decrease was recorded by Portugal (-3.3%), but Germany also fell considerably (-1.7%). The favourable pandemic situation boosted the economy in France (+0.4%), while strict regional lockdowns pushed down the output in Italy (-0.4%). However, as the pandemic was being brought under control, economies started to open slowly in April. Higher vaccination coverage, which is currently close to 40% of the adult population in large economies, will act as a greater catalyst for the relaxation of measures. The aim is to achieve a vaccination coverage rate of 70% before the end of June to allow for the lifting of government restrictions safely.

Industrial firms' sentiment reached historical highs in April, with the services sector also recovering gradually from government shutdowns. The PMI in industry rose to an all-time high of 62.9 in April. The index has stood in the expansion band for 10 months in a row and the positive message applies to all countries. All production categories are in growth territory, with demand for capital goods standing out in particular. Business confidence remains high also due to the expected lifting of government restrictions and strong external demand. However, supply chain problems have deteriorated and the pressure on price growth is at unprecedented levels. The positive situation in industry is reflected in higher pressure on the labour market, most notably in Austria and the Netherlands. The PMI in services has also moved to the expansion band, due mainly to the contribution of Spain. The European Commission's sentiment indicator has improved in all components, including consumer sentiment, although the results for retail sales were already encouraging in March. Sales grew by almost 3% month on month due mainly to spending in Germany during the short relaxation of measures in March.

CF analysts' expectations remained unchanged from April. The euro area economy should grow by more than 4%

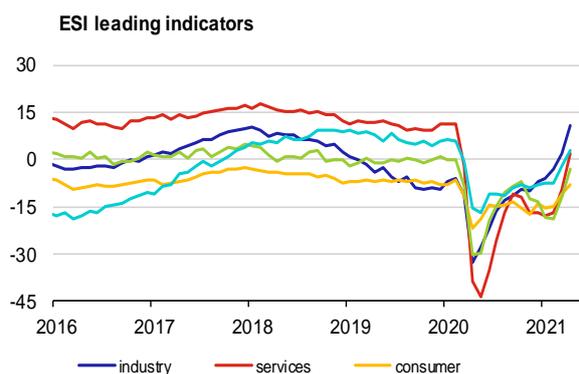


Note: Charts show institutions' latest available outlooks of for the given economy.

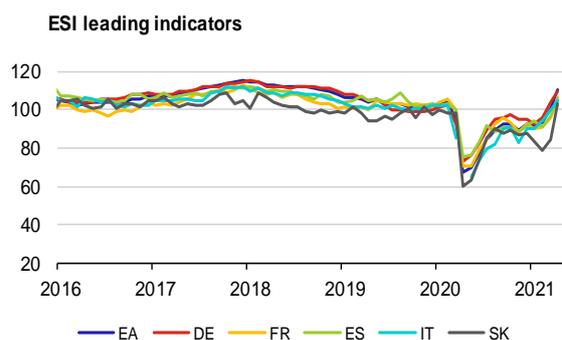
both in 2021 and 2022. According to the CF survey, private consumption will not pick up more markedly until 2022, while government consumption will slow significantly next year. Spain and France are expected to record the fastest growth this year (both by 5.5%), while Germany is expected to grow by 3.3%. The French, Italian and German economies will grow by about 4% in 2022, while Spain will maintain a growth rate of more than 5%.

The inflation outlook for the euro area increased for this year (1.7%), while the forecast for 2022 remained unchanged (1.3%). As expected, euro area inflation rose to 1.6% in April, due mainly to the contribution of energy prices. While inflation in Germany stood at 2%, prices are decreasing at a rate of 2% in Greece. Current price developments have been reflected in a higher inflation outlook for all large euro area economies. Prices will grow the fastest in Germany (2.2%) this year, while inflation in Italy will be 1 percentage point lower on average.

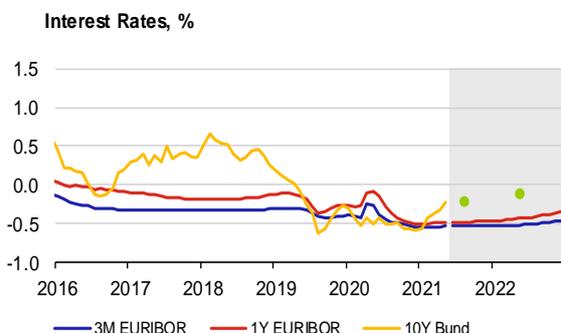
Higher inflation pressures, the expected opening of economies and the tightening of financial conditions in the euro area are creating a difficult environment for decision-making by central bankers. The announcement of a record-high fiscal stimulus package in the USA has stirred up debate on a possible further rise in inflation pressures in the US economy. This debate has meanwhile spilled over to Europe and many ECB representatives have thus had to face questions about the further development of monetary policy in the euro area. They believe a decline in the volume of asset purchases is not on the agenda and its increase will depend on current financial conditions. Price pressures in the production sector should have a relatively small impact on consumer prices, but the question is where the involuntary savings of consumers in the euro area will be channelled. However, the ECB does not expect the faster inflation to last long.



	industry	services	consum.	retail	constr.
2/21	-3.2	-17.0	-14.8	-19.1	-7.5
3/21	2.1	-9.6	-10.8	-12.2	-2.3
4/21	10.7	2.1	-8.1	-3.1	2.9



	EA	DE	FR	ES	IT	SK
2/21	93.4	95.8	91.3	90.7	94.6	79.2
3/21	100.9	103.7	96.2	96.9	99.5	84.7
4/21	110.3	109.4	104.7	106.0	104.8	103.3



	4/21	5/21	8/21	5/22
3M EURIBOR	-0.54	-0.53	-0.53	-0.51
1Y EURIBOR	-0.48	-0.48	-0.48	-0.43
10Y Bund	-0.32	-0.21	-0.20	-0.10



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

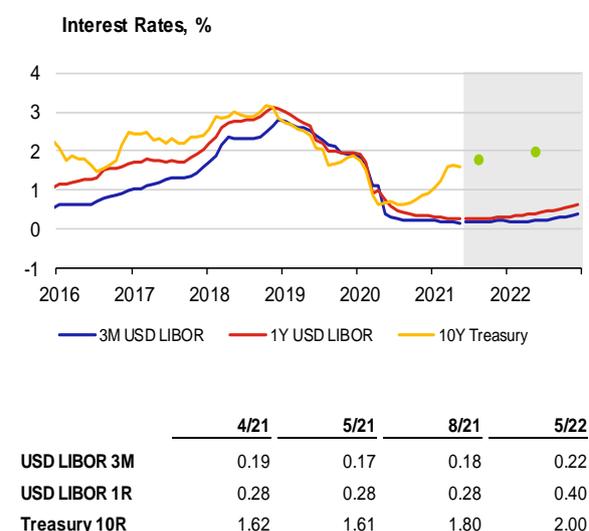
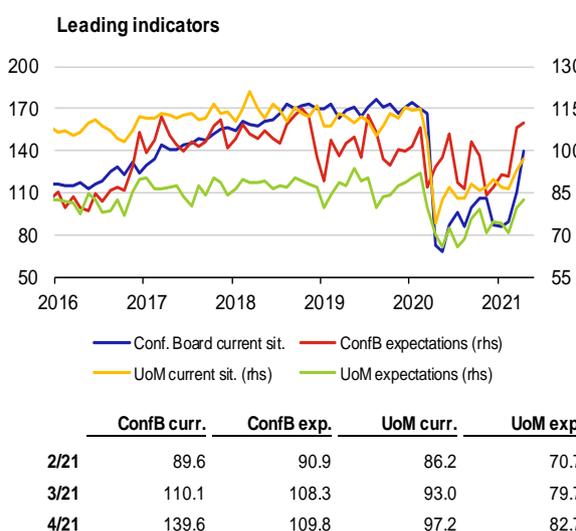
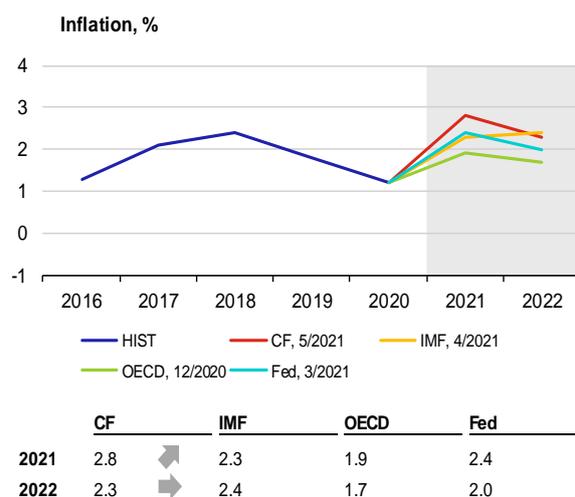
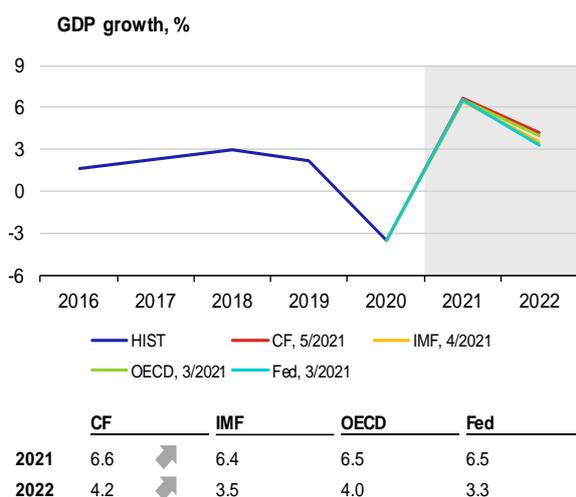
	5y5y	SPF
3/21	1.47	1.69
4/21	1.54	1.68
5/21	1.58	1.68

II.2 United States

US economic growth outlooks are surging in response to action taken in the White House and an improving coronavirus situation. More than 46% of the population had received at least one dose of the Covid-19 vaccine and the daily number of new infections has been gradually declining since early May. GDP recorded record-high growth in Q1 (up by 6.4% q-o-q), driven by retail purchases in March, with households spending some of the funds obtained as part of the first government stimuli. Purchases continued into April, but there was no increase compared to March. The new CF outlook expects GDP to grow by 6.6% this year, 0.2 pp higher than a month ago. The economic growth outlook was again revised upwards for next year, to 4.2%. In January 2021, the CF outlook was at 4.4% for this year and at 3.4% for 2022.

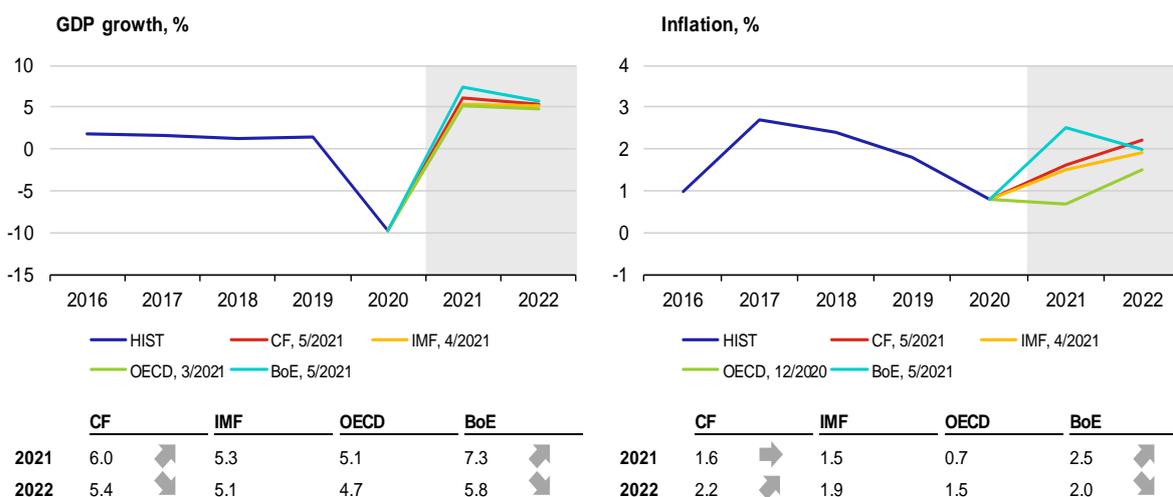
US international trade has recovered and imports have already exceeded pre-pandemic volumes. The volume of exports has not yet reached the pre-crisis level but is continuing to grow. Leading indicators also confirm positive sentiment. The PMI in services has grown to its highest level (64.7) in more than five years, while the PMI in industry is at its highest level in a decade (60.5).

Inflation is currently a big topic in the USA; it increased sharply to 4.2% year on year in April, its highest level since the financial crisis. Consumer price growth is largely due to increases in prices of energy (25.1%), food (2.4%) and services (2.5%). Energy prices are largely attributable to fuel costs, which grew by almost 50% in April. Growth in industrial producer prices is also record high (6.1%), most notably for finished products (9.4%). Generally, inflation pressures are not easing – CF increased its inflation outlook for 2021 by 0.2 pp to 2.8%, and the outlook for 2022 expects consumer prices to rise by 2.3%, i.e. the same as a month ago. US Fed Chairman J. Powell indicated that more time will be needed before the pace of quantitative easing slows, but some academics have warned against an overheating of the US economy.



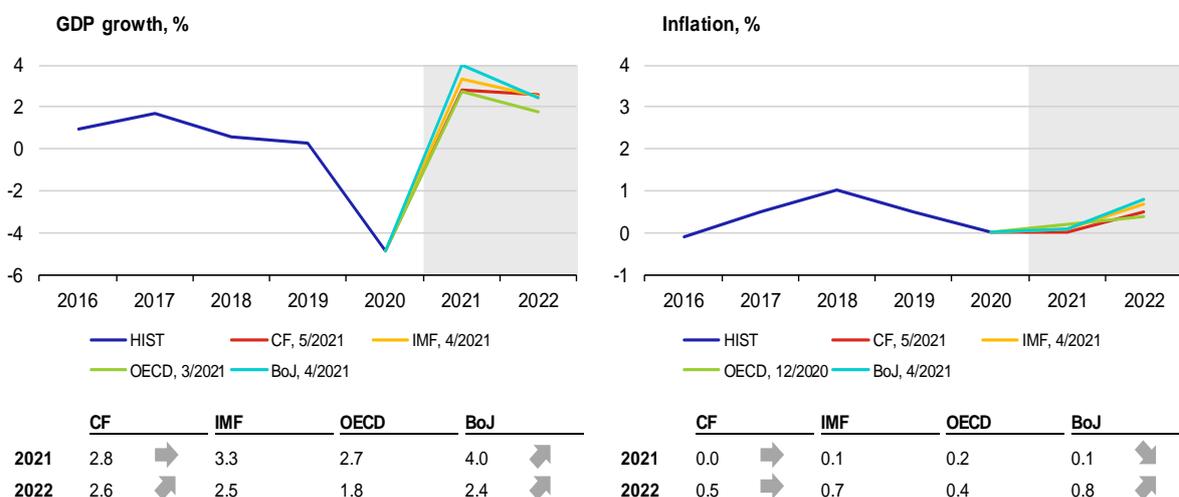
II.3 United Kingdom

The BoE's new forecast has revised GDP growth upwards for this year (from 5% to more than 7%) and is expecting the economy to recover to the pre-pandemic level in 2021. It forecasts a sharp rise in GDP (4.3%) for 2021 Q2, mainly due to progress in the vaccination programme and higher mobility related to the reopening of the economy. The April increase in consumer spending will also contribute significantly. Also forecasted is a slight rise in unemployment (to 5.2%) and growth in inflation close to the 2% target. According to the BoE, current monetary policy, i.e. a 0.1% interest rate and QE totalling GBP 895 billion, remains adequate. Positive developments are also reflected in the PMI, which is continuing to increase in the expansion band (60.7), signalling the strongest growth in private sector output in the UK in over 7 years, fostered mainly by a rapid expansion in activity in services. The ratification of the Trade and Cooperation Agreement between the EU and the UK is also noteworthy. This officially concluded the Brexit process, although relations will continue to be resolved.



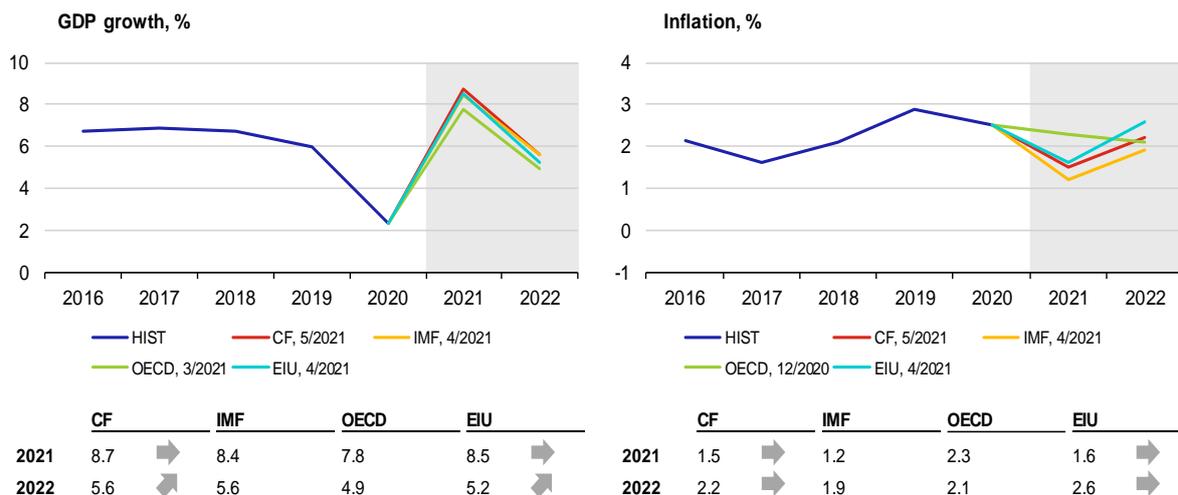
II.4 Japan

Japan is tightening anti-epidemic measures due to the spread of new mutations of the coronavirus. The situation remains more favourable in Japan than in Europe, but the daily number of cases is rising steadily and is much higher than in most countries in the region. Moreover, vaccination has been the slowest of all advanced countries (only 3% of the population as of 12 May). Electronics and car manufacturers, which are important for the Japanese economy, have been hit by a global shortage of semi-conductors, but macroeconomic indicators still suggest a continued economic recovery. The March data showed lower unemployment, higher inflation and the first year-on-year increase in wages after a 11 months of decline. The April PMI index confirmed an improving economic situation, but consumer sentiment declined slightly.



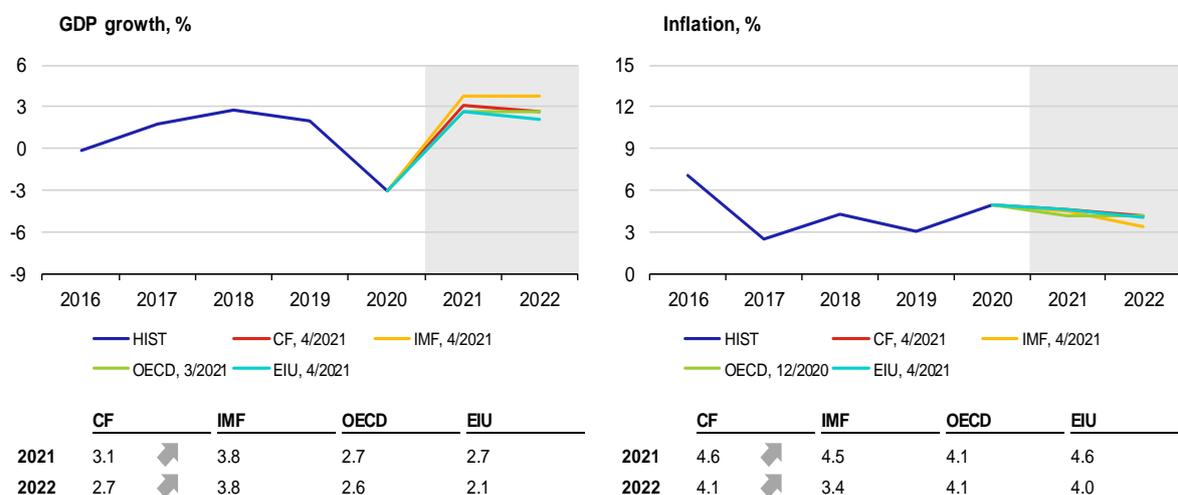
II.5 China

A sharp annual increase of 18.3% in the Chinese economy in Q1 reflects a pronounced increase in consumption, along with base effects. Consumption recovered significantly after the pandemic-induced downturn and should remain the main driving force of the Chinese economy this year, as further restrictions at the national level are unlikely due to the improving epidemic situation. The contribution of investment and net exports was also distinctly positive in Q1. The CF analysts expect the Chinese economy to grow by 8.7% and 5.6% year on year in 2021 and 2022 respectively. Gradually increasing inflationary price pressures reflect the growing recovery in domestic demand supported by cost effects arising from growing global prices of oil, non-energy and food commodities. A rising supply of pork in particular is acting in the opposite direction. According to the May CF outlook, consumer prices in China will grow at a pace of 1.5% this year, picking up to 2.2% in 2022.



II.6 Russia

The first estimate of economic activity in Russia in Q1 suggests a continuing moderation of its annual decline. Following the largest decline in 2020 Q2, there was a turning point and the pace of the annual decline in GDP moderated by about 50% each time. The decline in GDP in Q1 amounted to 1.0%, which is 0.8 pp more moderate than at the end of the year. The Russian central bank has assessed renewed demand as being fairly robust and exceeding supply in some sectors. At the same time, it assesses the pace of inflation and inflation expectations as elevated. Owing to strong inflation pressures, the Russian central bank increased the key interest rate by a further 0.5 pp to 5.0% on 23 April and also increased this year's inflation forecast to 4.7–5.2%. It expects a return to the 4% target in mid-2022 and GDP growth to reach 3–4% this year.

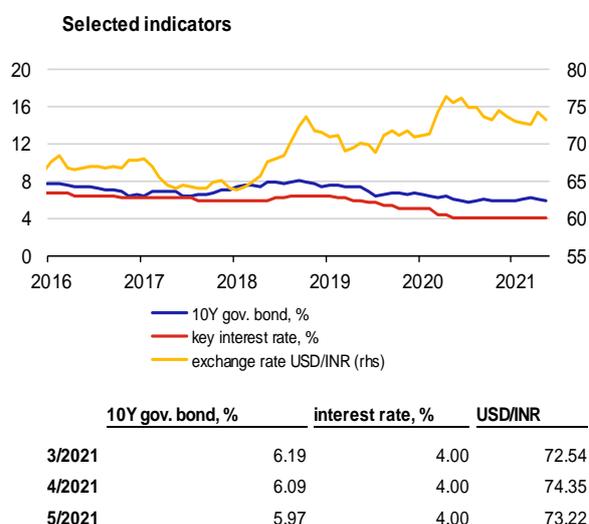
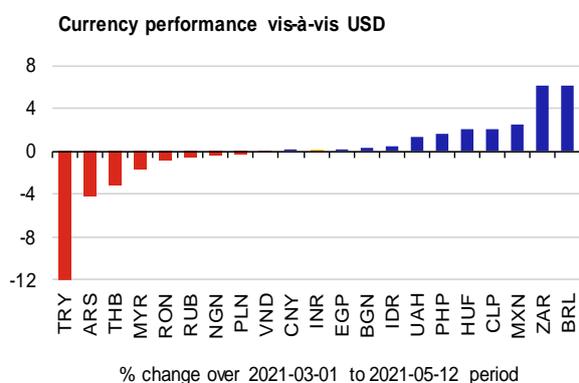
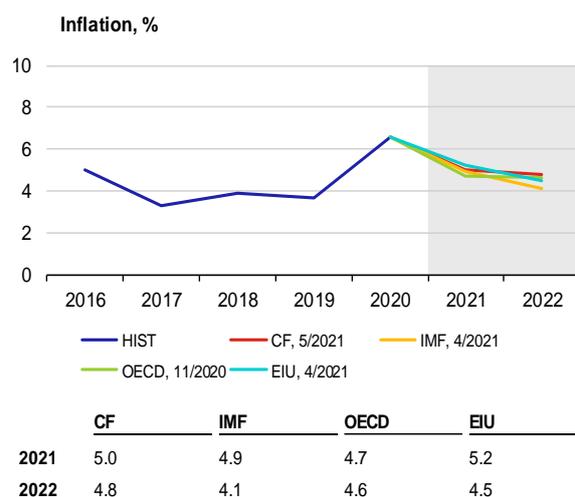
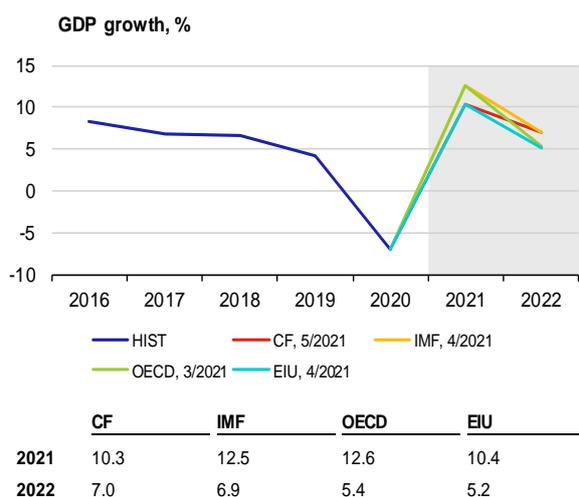


II.7 India

The coronavirus is spreading massively in India, seeing a collapse of the healthcare system. The situation in the country is tragic, with almost 400,000 new infections confirmed daily. This is four times more than during the peak of the first wave in mid-September 2020. Inconsistent measures by the central government and regional governments have also contributed to the spread. The central government headed by Prime Minister Modi has opposed hard lockdowns, while promoting mass religious and political events. Both factors have fostered a faster spread of the virus. By contrast, local governments are introducing lockdowns and restrictions in an effort to slow the current crisis. The healthcare system is running out of capacity, with oxygen shortages the biggest problem. At the same time, some members of the opposition are criticising the government for exporting millions of doses of the coronavirus vaccine in the current health crisis. Criticism of the government on social networks has in turn led to censorship of these views.

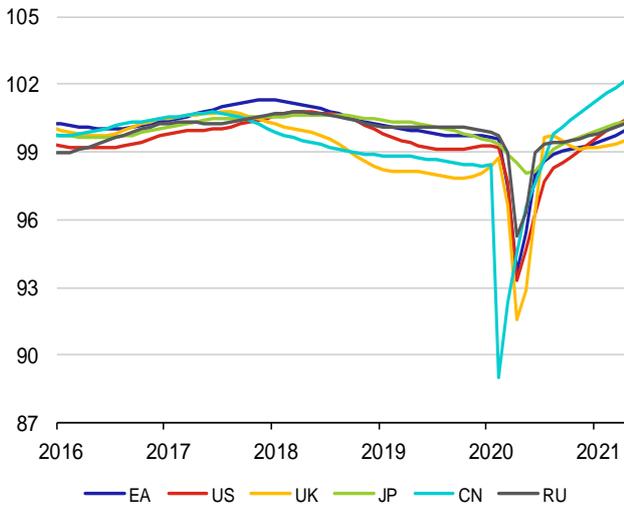
Current outlooks for India's economic growth in 2021 are yet to reflect the current situation. Although the daily number of new infections does not seem to be increasing further, it is uncertain whether this is the actual peak of the second wave and what the government's next steps will be to stop the pandemic. The pace of vaccination has picked up slightly. Something over 10% of the population has received the first dose, with mainly risk groups being vaccinated. The economic recovery was fostered by households' optimism and a gradual growth in consumption. A strong recovery was also recorded in industry and some services sectors, while agriculture is stagnating. The biggest hope is deferred investment, which could bring the Indian economy to double-digit growth this year.

Consumer price inflation in India was 4.3% year on year in April. The outlooks by international institutions expect inflation to reach 5% in total this year; the central bank's 4% target will not be achieved next year either, with consumer price inflation expected at just below 5%. Given the current situation, the rupee might have been expected to weaken, but the currency is broadly stable and the CF outlooks indicate that it will maintain its current exchange rate of around INR 74/USD in the years to come.

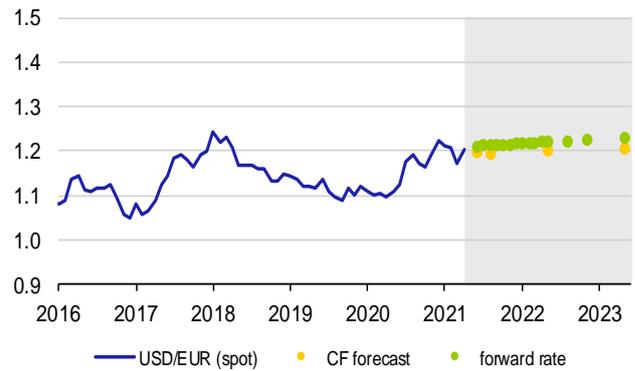


III. Leading indicators and outlook of exchange rates

OECD Composite Leading Indicator

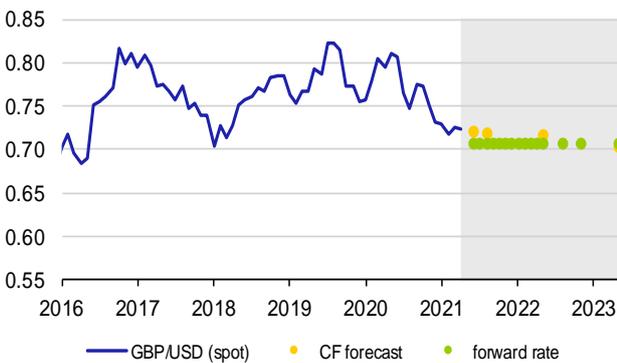


The US dollar (USD/EUR)



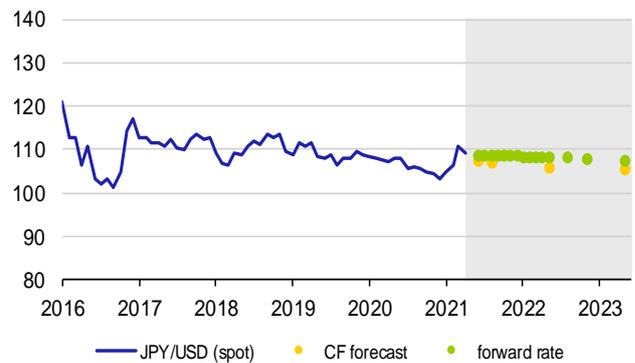
	10/5/21	6/21	8/21	5/22	5/23
spot rate	1.191				
CF forecast		1.199	1.195	1.203	1.207
forward rate		1.214	1.215	1.223	1.233

The British pound (GBP/USD)



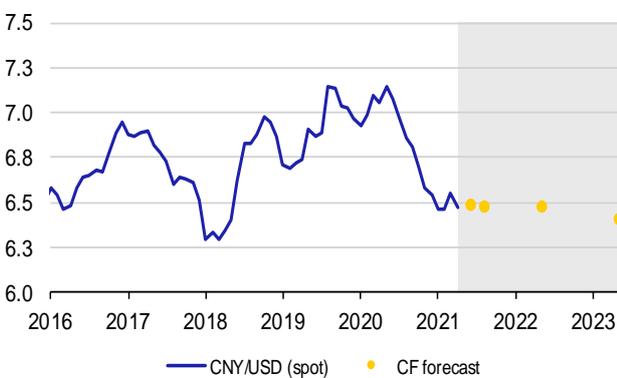
	10/5/21	6/21	8/21	5/22	5/23
spot rate	0.727				
CF forecast		0.722	0.720	0.717	0.705
forward rate		0.708	0.708	0.708	0.708

The Japanese yen (JPY/USD)



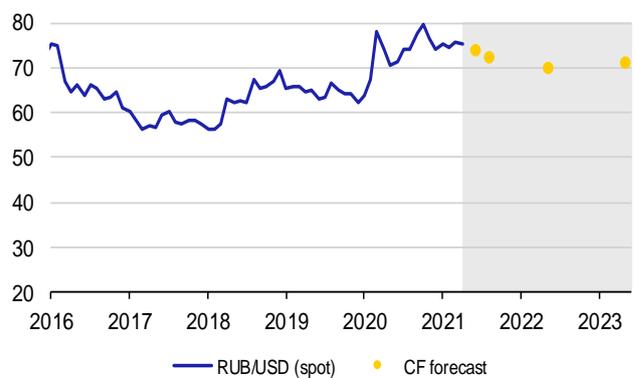
	10/5/21	6/21	8/21	5/22	5/23
spot rate	109.4				
CF forecast		107.7	107.2	106.1	105.5
forward rate		108.8	108.7	108.3	107.7

The Chinese renminbi (CNY/USD)



	10/5/21	6/21	8/21	5/22	5/23
spot rate	6.418				
CF forecast		6.490	6.487	6.480	6.410

The Russian rouble (RUB/USD)

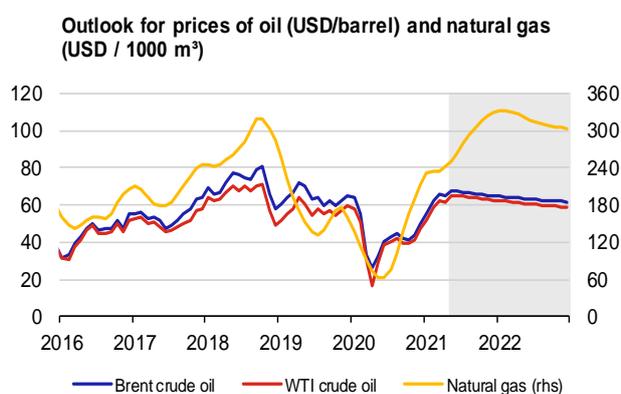


	10/5/21	6/21	8/21	5/22	5/23
spot rate	74.17				
CF forecast		74.16	72.64	70.21	71.26

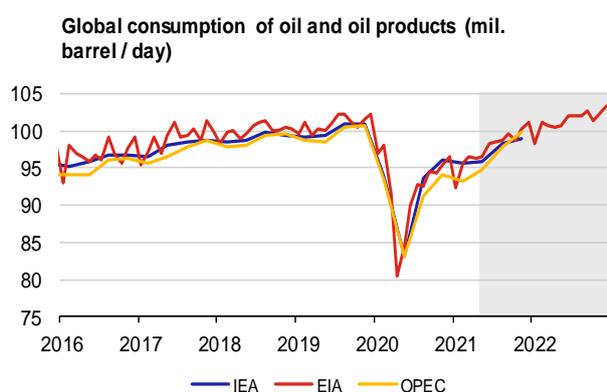
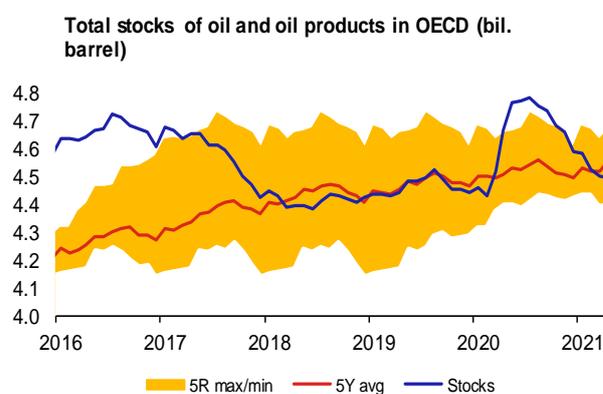
Note: Exchange rates as of last day of month. Forward rate does not represent outlook; it is based on covered interest parity, i.e. currency of country with higher interest rate is depreciating. Forward rate represents current (as of cut-off date) possibility of hedging future exchange rate.

IV.1 Oil

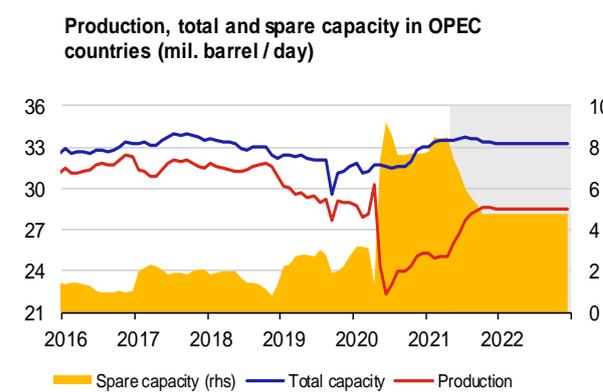
The Brent oil price stabilised at close to USD 63.5/bbl from mid-March to mid-April. Sentiment on commodity markets then improved and the price rose due to an increased outlook for demand. At that time, all three biggest oil agencies revised the outlook for global demand for oil upwards, while the higher oil price was also fostered by favourable economic news from the USA and China and a weaker dollar. However, higher price growth was hindered by weaker demand from refineries due to regular maintenance before the summer season and the deteriorating epidemic situation in India, Japan and Latin America, and initially also protracted lockdowns in some European countries. It was hindered on the supply side by uncertainty regarding a possible return of Iranian oil to global markets and the planned rise in oil output by OPEC+. Market sentiment improved gradually as vaccination picked up and European countries and the US planned to relax anti-epidemic measures; the Brent oil price thus gradually approached USD 70/bbl in the first half of May. According to the IEA, most excess stocks of oil and oil products in OECD countries, accumulated last year after the outbreak of the epidemic, have been used up due to an almost year-long output cut in OPEC+ countries. The expected strong growth in demand for oil in 2021 H2 should result in a further decline in global inventories despite a gradual increase in output in OPEC+ countries. However, the EIA expects the upward pressure on oil prices to weaken as output grows. The Brent oil price is thus expected to decrease to USD 63/bbl on average in Q3 and to USD 60/bbl in Q4. It should stand around this level next year too. The market curve at the start of May was signalling a more moderate decline to around USD 65/bbl and USD 62/bbl at the end of 2021 and 2022 respectively. The May CF expects (broadly in line with the market curve) a Brent crude oil price of USD 64/bbl at the one-year horizon (individual estimates range between USD 53/bbl and USD 75/bbl).



	Brent		WTI		Natural gas	
2021	64.97	↗	62.30	↗	275.62	↗
2022	63.07	↗	60.37	↗	317.30	↗



	IEA	EIA	OPEC
2021	97.14	↗	97.68
2022		↗	101.43



	Production	Total capacity	Spare capacity
2021	26.90	↗	33.44
2022	28.47	↗	33.24

Source: Bloomberg, IEA, EIA, OPEC, CNB calculation

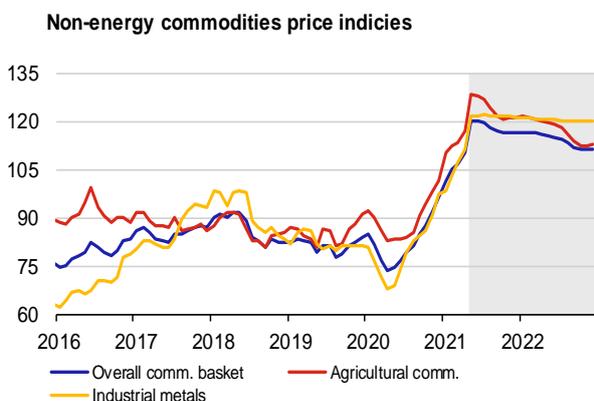
Note: Oil price at ICE, average gas price in Europe – World Bank data, smoothed by the HP filter. Future oil prices (grey area) are derived from futures and future gas prices are derived from oil prices using model. Total oil stocks (commercial and strategic) in OECD countries – IEA estimate. Production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

IV.2 Other commodities

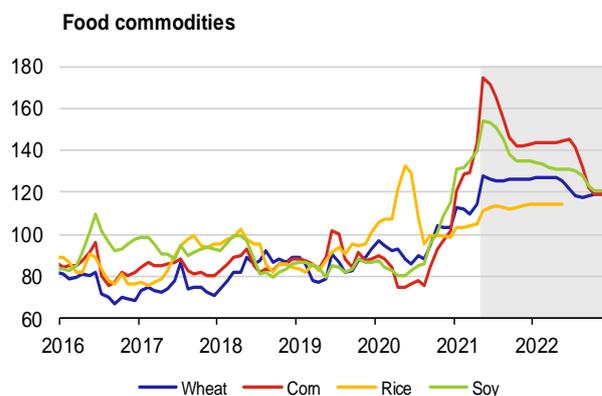
Gas prices increased in all regions in April, but most notably in Europe due to cold weather, which delayed the start of the seasonal filling of reservoirs. Inventories at the end of April were virtually the same as at the end of March – around 30% of total capacity compared to 62% a year ago. By contrast, coal prices decreased in April due to the stabilisation of exports from Australia after floods and weaker demand from India and China.

The non-energy commodity price index grew further, picking up sharply from mid-April due to both its sub-indices. The outlook is still falling sharply due mainly to the expected correction of the food commodity price index. This one is currently at a more than 8-year high, with the price of maize approaching record levels. This is due to a pick up in demand from China (both for food production and fodder purposes), the expected delay in harvest in the USA due to cold weather and a weaker harvest outlook in Brazil because of hot, dry weather. Growth in demand for petrol and hence bioethanol, which is produced using maize, could also play a role. There are similar reasons for the large increase in soy prices. However, prices of wheat, rice, sugar and coffee have increased to a lesser extent, while the price of pork has increased significantly.

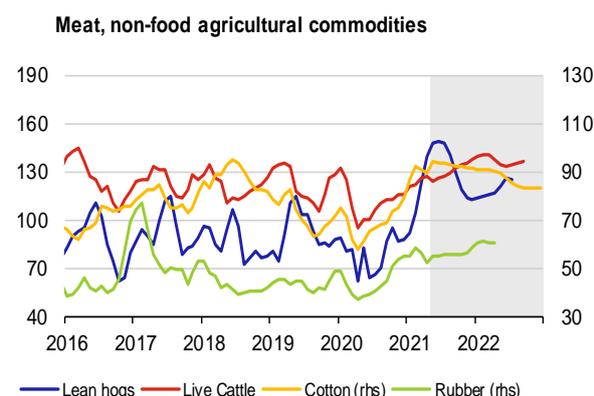
The industrial metals sub-index has been growing continually for over a year due to sustained growth in global manufacturing. Metal prices were also affected by further moderate dollar depreciation and concerns over extraction disruptions and weaker raw materials' exports from South America due to a deteriorating pandemic situation. The price of aluminium has been rising sharply since February. The price of copper resumed strong growth in mid-April, reaching an all-time high in May. Prices of other base metals followed a similar pattern. The price of iron ore reached levels not seen since it started to be monitored. Although iron ore imports to China weakened m o m in April, they were 6.7% higher y o y since



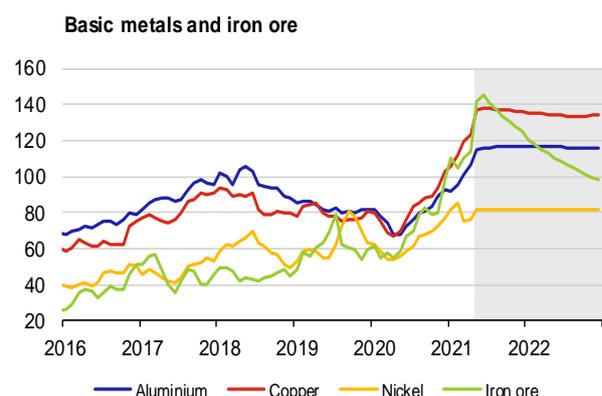
	Overall	Agricultural	Industrial
2021	114.0 ↗	120.3 ↗	116.1 ↗
2022	114.0 ↗	117.2 ↗	120.4 ↗



	Wheat	Corn	Rice	Soy
2021	121.7 ↗	146.8 ↗	109.9 ↗	140.4 ↗
2022	122.4 ↗	134.9 ↗	114.7 ↗	128.0 ↗



	Lean hogs	Live Cattle	Cotton	Rubber
2021	126.5 ↗	128.3 ↗	91.6 ↗	55.7 ↗
2022	119.1 ↗	136.9 ↗	86.7 ↗	60.4 ↗



	Aluminium	Copper	Nickel	Iron ore
2021	110.3 ↗	129.7 ↗	80.8 ↗	126.7 ↗
2022	116.1 ↗	134.2 ↗	81.8 ↗	108.1 ↗

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.

early 2021. Global steel production was 15.2% higher y o y in March (up by 19.1% in China and 23.9% in India).

Assessment of the impacts of the pandemic on the world's major economies: A crisis of supply or demand?¹

The coronavirus pandemic and the related anti-epidemic measures represent an unprecedented negative shock to the global economy in the form of a dramatic fall in economic activity. However, since the onset of the pandemic the question has been to what extent the contraction of the individual economies, largely related to anti-epidemic measures (lockdowns), can be interpreted as a negative anti-inflationary shock to demand and, conversely, what proportion of the observed decline in GDP can be attributed to a negative (cost) inflationary shock on the supply side. This article shows that the currently available views of central banks and international institutions, and their interpretation of the nature of the economic shock, vary dramatically. Therefore, to contribute to this debate, we have conducted our own empirical and model analyses of data on the world's four largest advanced economies – the USA, the euro area, Japan and the United Kingdom. An empirical comparison of the pandemic-induced crisis with the global financial and economic crisis and model simulations confirm that the sharp economic downturn observed in 2020 bears, for the most part, the hallmarks of a supply shock.

Motivation and goal

In periods of dramatic change, assessing the nature of the shock and the related evaluation of the cyclical position of the economy is crucial for macroeconomic analysis and forecasting. The forecast of real macroeconomic variables and inflation depends on whether the development of the real economy is assessed as being driven by demand effects (i.e. effects fostering the co-movement of the real economy and inflation) or supply factors (i.e. factors causing inflation and the real economy to move in opposite directions).² This assessment is vital for economic and monetary policy makers when forming an appropriate response.

The need to interpret the nature of the shock correctly is even more important in the case of the coronavirus pandemic, as this is a crisis whose cause, extent and magnitude is unparalleled in modern economic history. The governments of individual countries responded to this shock in the first half of 2020 by large-scale fiscal expansion, accompanied by sharp interest rate cuts by monetary authorities or a further easing of the monetary conditions, including the use of unconventional instruments.³ During the period of initial uncertainty, this response was aimed at preventing drastic adverse economic and social impacts. Given the availability of observed data for 2020, more than a year on, it is now appropriate to reflect more closely on the nature and impacts of the current crisis and describe the findings.

The aim of this article is to assess the sharp drop in GDP in 2020 using data on the world's four largest advanced economies (the USA, the euro area, Japan and the United Kingdom) in the context of demand and supply effects. To achieve this goal, the first natural step is research on analyses published on this topic so far by central banks and international institutions. This has so far only led us to conclude that in almost all cases an interpretation of the economic downturn from the perspective of a decomposition into the output gap and trend is not publicly available or, where available, varies significantly. Thus, uncertainty remains as to whether we can attribute the impacts of the shock to an opening of the negative output gap (an anti-inflationary negative demand shock) or to a drop in the trend (an inflationary negative supply shock). We therefore present our own analyses which aim to contribute to the understanding of this problem.

Foreign institutions' views on the nature of the coronavirus crisis

Since the onset of the coronavirus pandemic, it has been very difficult to obtain a clear macroeconomic interpretation of the current crisis from central banks and other international institutions in terms of the cyclical position of economies. The unprecedented nature of the shock has markedly increased the fundamental uncertainty regarding the decomposition of the drop in economic activity into the output gap and the trend and thus the structure of the demand and supply factors. In the absence of observed data, it was difficult especially at the start of the coronavirus crisis to identify the size of the negative output gap relative to the estimated economic decline.

The decomposition of the drop in GDP into trend and output gap in 2020 Q2 varied considerably in different institutions. The monetary policy reports published last year by the Bank of England, the Bank of Japan and the Bank of

¹ Authors: Jan Brůha, Martin Motl and Jaromír Tonner. The views expressed in this article are those of the authors and do not necessarily reflect the official position of the Czech National Bank. The authors would like to thank Petr Král, Executive Director of the Czech National Bank's Monetary Department, for his valuable comments.

² In this article, we define demand and supply shocks in terms of their effect on inflation. We consider this perspective as relevant for central banks seeking to maintain low and stable inflation. However, this is not the only possible view. The literature also presents an approach which defines the supply shock as permanent and the demand shock as temporary (see, for example, Blanchard and Quah, 1989). We chose our approach due to its relevance to monetary policy and because it is supported by evidence showing that the Phillips curve (i.e. the cyclical relationship between economic activity and inflation) is an empirically valid macroeconomic relationship (see, for example, Andrieu et al., 2013, 2016, Ball and Mazumder, 2019, 2020).

³ An overview of fiscal measures was presented in [The fiscal policy reaction to COVID-19, or the fast way out of the crisis](#) (CNB - Global Economic Outlook 05/2020). The response of central banks was described in [Central banks' monetary policy in response to the coronavirus epidemic](#), CNB - Central Bank Monitoring II/2020.

Table 1 – Current estimates of output gaps in 2020 for selected economies by various international institutions

(in %)		
Area	Institution	Output gap
USA	Federal Reserve System	data are unavailable
	International Monetary Fund (World Economic Outlook, April 2021)	-3.1
Euro area	European Central Bank	data are unavailable
	International Monetary Fund (World Economic Outlook, April 2021)	-4.3
Japan	Bank of Japan (Monetary Policy Report, January 2021)	-3,0
	International Monetary Fund (World Economic Outlook, April 2021)	-2.7
United Kingdom	Bank of England (Monetary Policy Report, February 2021)	-1.2
	International Monetary Fund (World Economic Outlook, April 2021)	-4.4

Note: Estimates for individual quarters are not available.
Source: IMF, ECB, Fed, Bank of Japan, Bank of England.

Canada suggest⁴ that they attributed the drop in the activity of their economies in Q2 about fifty per cent to supply effects and fifty per cent to demand ones. On the other hand, according to all information available, in September 2020 the ECB was still largely interpreting the drop in euro area GDP as a negative demand effect, i.e. as in the case of the global financial and economic crisis through a significantly negative output gap.⁵ Table 1 shows the lack of information across individual international institutions and persisting uncertainty regarding the interpretation of the drop in GDP in 2020.

Despite the widespread use of the concept of the output gap, there is no single approach to calculating it, nor is there a unified need to identify it. On the contrary, this concept is used for several different motivations, analytical approaches and purposes. In line with our definition of the effects of supply and demand shocks through the impact on inflation, we assume in this article the output gap to be that part of the change in output related directly to demand-side price pressures. Alternatively, the output gap is viewed as a temporary output component. This temporary component can be identified in different ways, for example, using structural vector autoregression models (Blanchard and Quah, 1989) or statistical filters. Statistical filters are a widely used benchmark for the decomposition of GDP into the output gap and trend. However, a decomposition using statistical univariate filters such as, for example, the well-known Hodrick-Prescott filter, which decompose the time series based on their frequency properties, may not be – especially in atypical situations – consistent with the inflationary or anti-inflationary effect of the given shock. In addition to the different motivations, the use of statistical filters also has technical aspects (see Box 1) which, in our opinion, actually disqualify their application to the current coronavirus crisis.

Owing to the unavailability of information on output gap estimates, the different approaches of international institutions and the problems associated with the use of statistical filters, we have conducted our own analyses. These analyses involve a comparison of the dynamics of the observed key macroeconomic variables in 2020 with the period of the global financial and economic crisis, along with a comparison of the observed inflation, including the outlook, with simulations of hypothetical scenarios of the price impacts of the drop in GDP in 2020 corresponding to a 100% demand shock and a 100% supply shock obtained using the NIGEM model.⁶

Box 1 – The pandemic shock and statistical filtration

Statistical filters are a simple and widely used instrument for the decomposition of GDP into the output gap (the cyclical component) and trend. An instrument which is used especially often is the Hodrick-Prescott filter, against which the results of other methods are also compared. This filter and the related alternatives (such as the band-pass filter designed in Christiano & Fitzgerald (2003) and the filter designed in Hamilton (2018)) can be viewed as an identification of components based on their frequency properties: the cycle should mainly contain components which correspond to the relevant frequencies. However, besides the usual end-point bias, the mechanical application of the Hodrick-Prescott filter to the GDP time series during the pandemic is associated with at least two additional problems. First, the two-sided nature of the filter means that the trend component in the period before the crisis is also reassessed, while this reassessment is considerable due to the depth of the output drop in 2020. However, such a reassessment is not intuitive, nor is it desirable due to the nature of the coronavirus crisis (an unexpected pandemic should not have any impact on the trend before 2020).

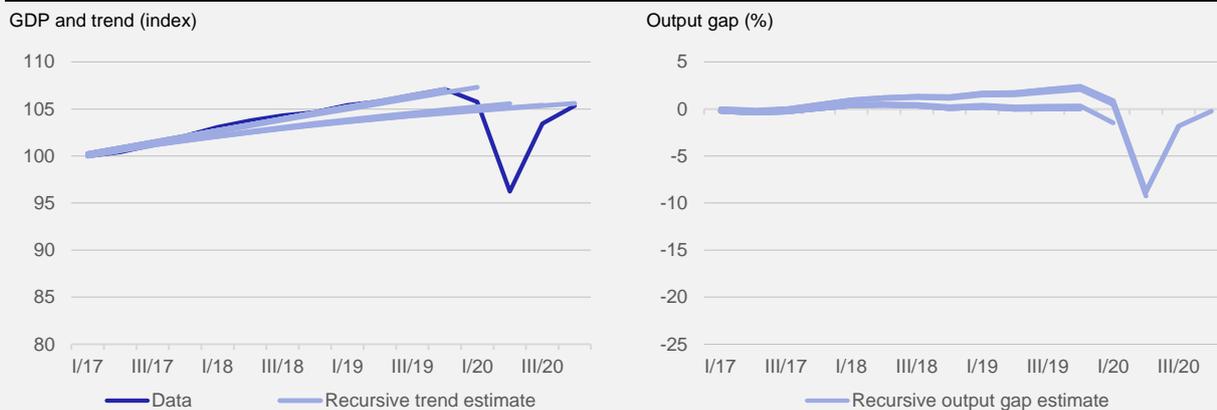
⁴ Bank of England (Monetary Policy Report, August 2020), Bank of Japan (Monetary Policy Report, July 2020) and Bank of Canada (Monetary Policy Report, July 2020).

⁵ ECB staff macroeconomic projections for the euro area (September 2020 and March 2021) and Bodnár et al. (2020).

⁶ This is a global econometric model that captures in detail the interconnectedness of all the territories of the global economy. It has been used at the CNB for simulating alternative scenarios of external economic developments for many years now. For further details on the NIGEM model and its structure, see Hantzsche, Lopresto and Young (2020).

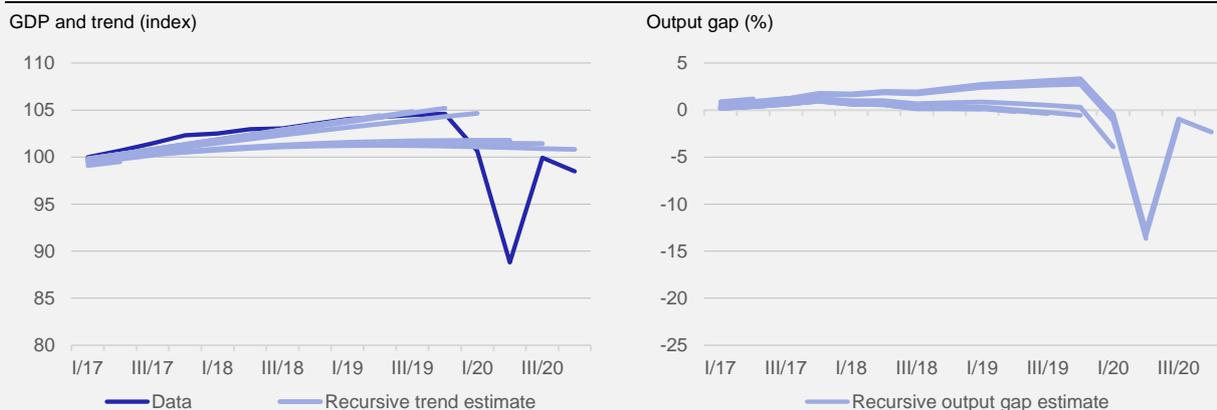
Second, by its very nature, no statistical filter can incorporate the impacts of administrative measures (such as shutdowns of parts of the economy – lockdowns) on the trend, as anti-epidemic measures are inherently temporary, and this is inconsistent with the filter’s objective to identify a permanent output component. Chart 1 clearly shows the two effects. Although this chart illustrates the above aspects using one specific filter, the conclusions are also generally applicable to other widely used two-sided filters. **The usefulness of the mechanical application of statistical filters as a benchmark for other output gap estimation methods is thus very limited in the case of dramatic shocks.**

Chart 1a – Recursive estimates of GDP decomposition into trend and output gap using the Hodrick-Prescott filter: USA



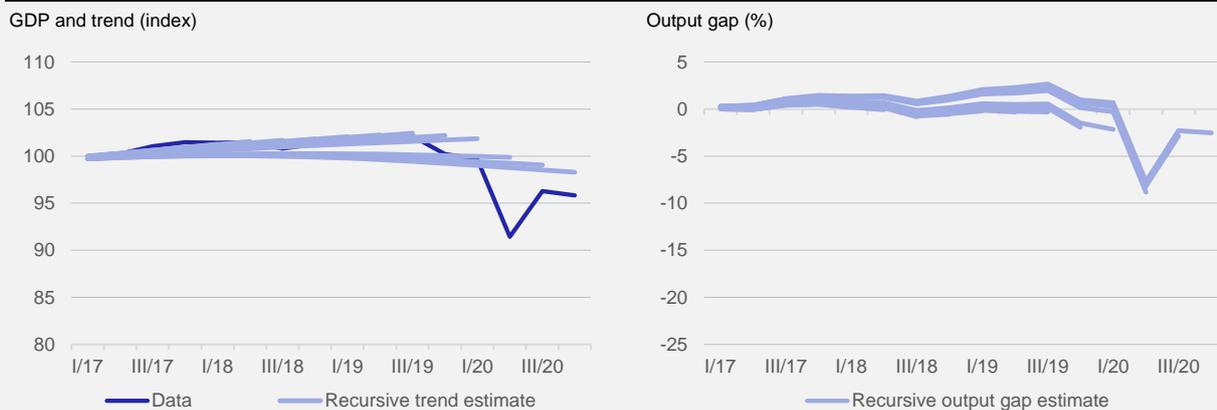
Source: Authors' calculations.

Chart 1b – Recursive estimates of GDP decomposition into trend and output gap using the Hodrick-Prescott filter: eurozone



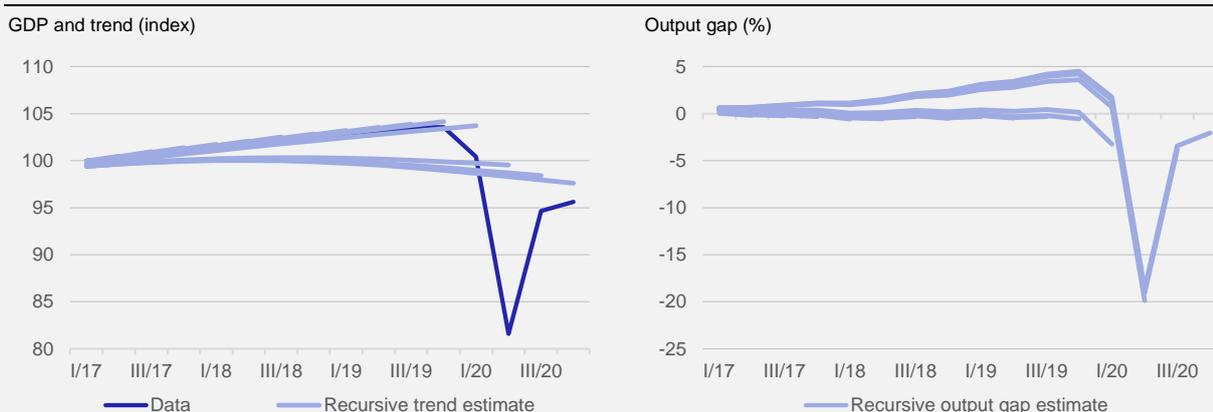
Source: Authors' calculations.

Chart 1c – Recursive estimates of GDP decomposition into trend and output gap using the Hodrick-Prescott filter: Japan



Source: Authors' calculations.

Chart 1d – Recursive estimates of GDP decomposition into trend and output gap using the Hodrick-Prescott filter: United Kingdom



Source: Authors' calculations.

Empirical analysis: comparison with the global financial and economic crisis

The global financial and economic crisis can be used as a natural benchmark for the assessment of supply and demand shocks, as GDP also fell sharply during that period. The 2009 crisis was primarily of a demand nature, i.e. the drop in economic activity was caused by factors from within the economic system in the form of a sudden market response to accumulated market imbalances. This sharp decline in real economic activity was followed by strong and long-running deflationary pressures (including a deterioration in the labour market situation) and an appropriate response from central banks in the form of monetary policy easing. The drop in economic activity was thus inevitably largely reflected in the opening of the output gap into deeply negative territory, i.e. largely as a negative demand effect.

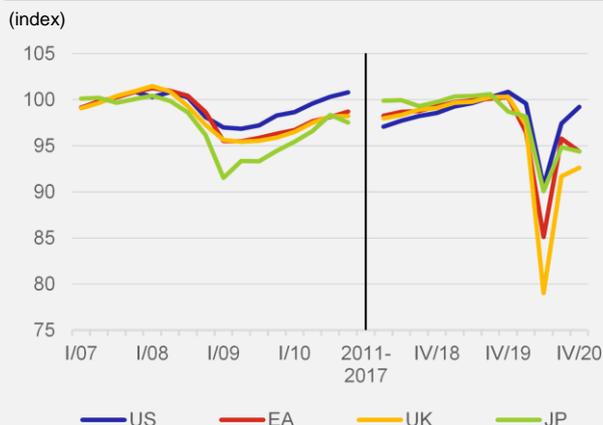
Over time, however, economic intuition and the available evidence have confirmed doubts about an immediate analogy between the sharp drop in GDP caused by the coronavirus pandemic and that recorded during the global financial and economic crisis. Unlike the standard demand crisis in 2009, from an economic intuition perspective, the nature of the pandemic shock is as such that many economic agents would like to continue to consume or produce, but are prevented from doing so by the pandemic situation and anti-epidemic measures. This is apparent from the rapid upswing in economic activity and sentiment reflecting very strong demand after shutdowns were lifted in the first half of 2020, and households' saving rates which soared in the economies under review in 2020 Q2 (see Chart 6).

An empirical comparison of economic activity and inflation during the pandemic with the global financial and economic crisis reinforces the aforementioned difference between the crises. The comparison used data on the world's four largest advanced economies: the USA (US), the euro area (EA), Japan (JP) and the United Kingdom (UK). Specifically, it analysed data on real economic activity (GDP and industrial production), consumer price inflation (CPI) and producer price inflation (PPI). Chart 2 and 3 compares GDP and Chart 4 and 5 industrial production during the previous and current crises. The sub-charts in the left-hand column show the impacts of the global financial and economic crisis more than ten years ago, while the sub-charts in the right-hand column depict the current situation. For illustrative comparison purposes, the values on each line of the sub-charts' vertical scales are the same. In addition to the different levels of restrictions imposed due to government anti-pandemic measures and their impacts on the behaviour of households and firms, the different rates of decline in GDP in the individual economies also reflect the different structure and starting position of economies. The charts reveal that the drop in industrial production was roughly the same in both crises, while the drop in real GDP was larger during the pandemic.⁷

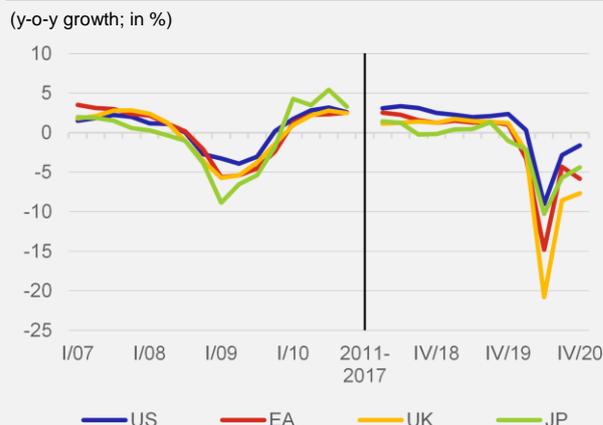
Since the onset of the pandemic, administrative restrictions and total shutdowns have applied mainly to the services sector, while industry has been rather marginally affected, with an only temporary sharp decline in production in 2020 Q2. While industry has been making a marked recovery since mid-2020, returning to the pre-crisis level at the end of the year, the services sector has remained subdued due to continued restrictive government measures. This also explains why industry was less affected overall during the coronavirus pandemic than in the global financial and economic crisis despite a deeper drop in economic activity. Economies with a higher share of industry in GDP may thus generally benefit more from these dual sectoral developments.⁸

⁷ Taking the euro area as an example, Babecká and Brůha (2020) show that international trade, which is a highly elastic GDP component, recorded similar declines during the two crises.

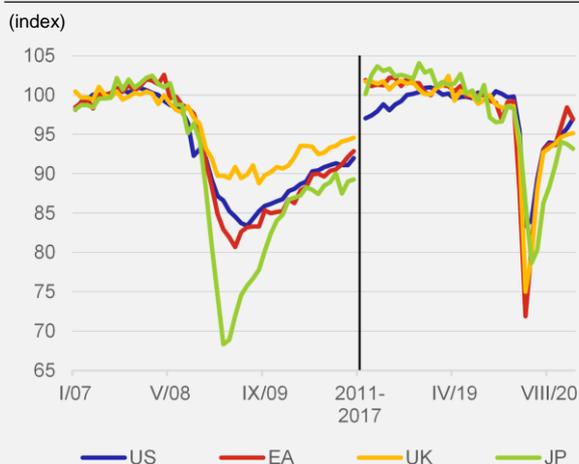
⁸ On the other hand, in the case of a longer-lasting pandemic coupled with longer anti-epidemic restrictions targeting primarily the services sector, there is the risk due to weaker demand that they will sooner or later also start to spill over into industry, a sector which is still growing at a solid rate. This might gradually reduce the differences in the performance of these two sectors over time. Industrial performance may also be

Chart 2 – GDP in countries under review during the previous and current crises

Source: Authors' calculations.
 Note: Index 100 = 2007 average for the global financial and economic crisis, index 100 = 2019 average for current crisis.

Chart 3 – GDP in countries under review during the previous and current crises

Source: Authors' calculations.

Chart 4 – Industrial production in countries under review during the previous and current crises

Source: Authors' calculations.
 Note: Index 100 = 2007 average for the global financial and economic crisis, index 100 = 2019 average for current crisis.

Chart 5 – Industrial production in countries under review during the previous and current crises

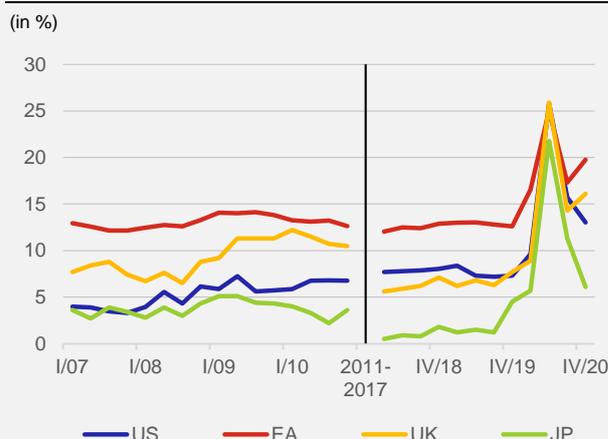
Source: Authors' calculations.

The different profile of the saving rate during the pandemic and the global financial and economic crisis can be attributed to differences in household behaviour. During the global financial and economic crisis, the saving rate increased gradually due to households' traditional precautionary savings as they adjusted their spending habits in line with worse times ahead in a forward-looking manner (see the left-hand sub-chart in Chart 6). By contrast, there was an unprecedented sharp and immediate rise in the saving rate during the pandemic, especially in 2020 Q2 (see the right-hand sub-chart in Chart 6). This was not confined to the economies under review. Anti-epidemic measures – whether shutdowns of specific shops and services or at least severe operational restrictions, or voluntary social distancing and self-isolation due to a fear of catching the virus – thus made it impossible for households to consume a large share of their normal expenditure basket. This was at a time when these restrictions were relatively amply compensated by governments in the form of large fiscal support programmes thanks to which, in many respects, household incomes have been more or less maintained, unlike in previous crises. By contrast, the easing of restrictions following an improvement in the epidemic situation in 2020 Q3 led to a sharp rise in the trend component of GDP (supply). This was largely accompanied by pent-up demand by customers who wanted to at least partly make up for (involuntarily) deferred consumption during shutdowns. The saving rate thus fell sharply in Q3.

dampened further by the increasing negative impacts of greater barriers to international trade and labour division, including disruptions to global supply chains which had been operating smoothly until recently. However, with the outbreak of the pandemic these supply chains have been disrupted due to the emergence of new, previously non-existent frictions and this is already being reflected in shortages of components and parts (currently semi-conductors and chips in the automotive industry, for example). In some cases, this has already led to a forced reduction in industrial production.

Although the drop in economic activity in 2020 was markedly deeper than during the global financial and economic crisis, we are still far from observing a similar development in the form of strong deflationary pressures (see Chart 7 and 8). During the global financial and economic crisis, both producer and consumer price inflation fell dramatically between 2008 and 2009. Producer price inflation dropped by more than 10 pp, while consumer price inflation decreased by around 5 pp in the countries under review. By contrast, producer price inflation fell by less than 5 pp in 2020, whereas consumer price inflation has so far only been minimally affected by the coronavirus crisis. The movement of both inflation rates could be explained, for example, by the movement of commodity prices. However, it can be noted that commodity prices declined during both crises, although the pace of return differed. It is also important to note that the evolution of commodity prices is not exogenous, particularly in large economies where it is significantly affected by demand. These findings thus point to a completely different mix of supply and demand factors in 2020 than in the global financial and economic crisis.

Chart 6 – Saving rates of households in countries under review during the previous and current crisis



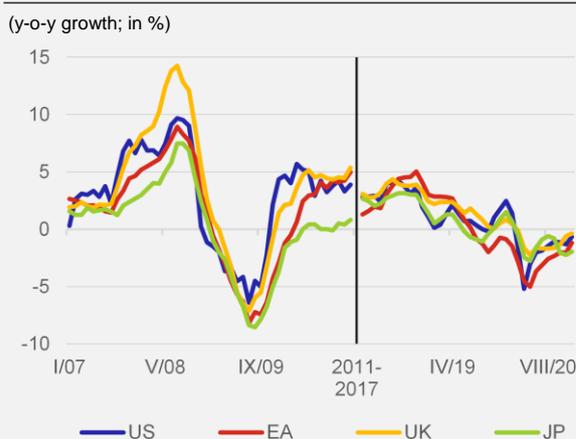
Source: Authors' calculations.

Chart 7 – CPI in countries under review during the previous and current crisis



Source: Authors' calculations.

Chart 8 – PPI in countries under review during the previous and current crisis



Source: Authors' calculations.

Model analysis: price impacts of the supply and demand scenarios of the drop in GDP in 2020

In addition to an empirical analysis, we also conducted an experiment using the global NIGEM model for the economies under review.⁹ The experiment compared observed inflation, including the outlook, with simulations of hypothetical scenarios of the price impacts of the drop in GDP in 2020 corresponding to a 100% demand shock and a 100% supply shock.¹⁰ The demand scenario describes a situation in which the observed decline in real economic activity in 2020 would be reflected to its full extent in an opening of the output gap into negative territory (a negative demand shock) amid a zero impact on the trend – supply. In the event of this 100% demand shock, the common model assumption for all selected economies is to limit central banks' monetary policy response to the zero lower bound (ZLB) on interest rates. Conversely, the supply scenario assumes that the observed drop in real economic activity in 2020 would be reflected to its full extent in a drop in trend (a negative supply shock) amid a zero impact on the output gap – demand. Within this 100% supply shock, the model assumption for all selected economies is that the monetary authorities will not respond to an inflationary shock to prevent the implementation of economic policy that would contradict the massive expansionary fiscal policy pursued simultaneously since the onset of the coronavirus pandemic. This assumption thus represents a temporary preference for an overshooting of monetary authorities' inflation targets in favour of support of economic growth through

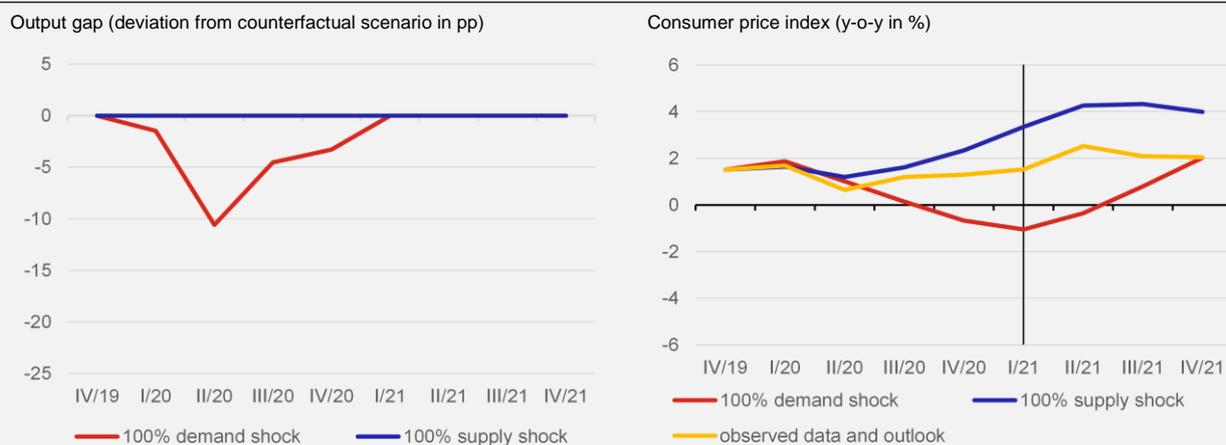
⁹ This model was also used for the first quantifications of the economic impacts of the pandemic on the global economy; see Motl (2020).

¹⁰ These extreme shocks represent simulations as compared to counterfactual scenarios in the form of macroeconomic assumptions from January 2020, i.e. the period before the outbreak of the coronavirus crisis in the analysed economies.

maintaining accommodative monetary conditions in a situation of uncertainty about the combination of supply and demand effects during a sharp pandemic-induced fall in GDP. The realistic model assumption of no monetary policy response to an inflationary shock in this situation also partially eliminates a potential monetary policy error which monetary policy makers could easily make if this negative supply shock did not ultimately materialise to a greater extent. In such a case, a large part of the drop in economic activity would be reflected in a significantly negative output gap, i.e. a strong anti-inflationary effect, which would, by contrast, require more accommodative monetary conditions. All model simulations also assume an observed exogenous shock to the exchange rate, including the price of oil. This is all in a situation of a forward-looking monetary policy response to the deviation of inflation or nominal GDP from the target and economic agents' rational expectations.

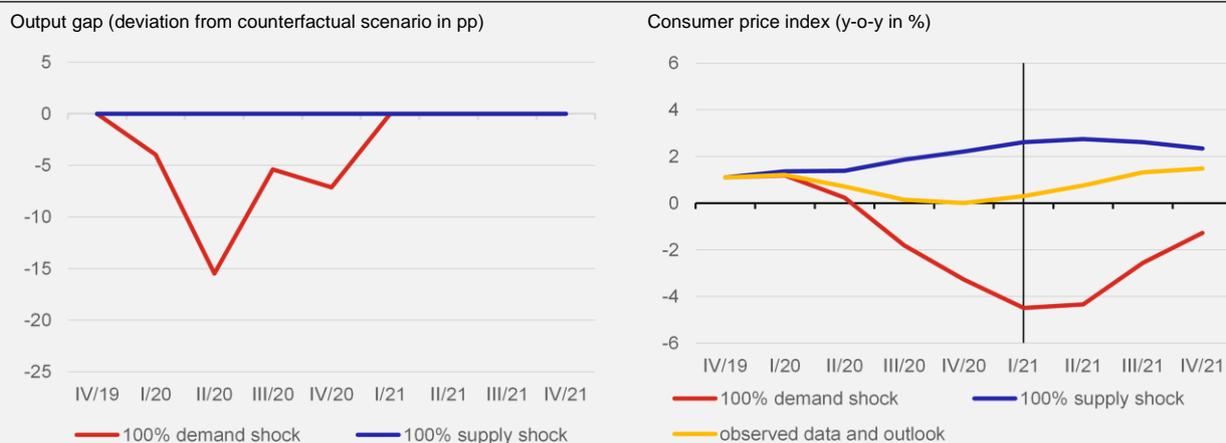
The resulting model simulations also indicate a relatively small opening of the negative output gap at the expense of a drop in the trend in 2020 and hence a smaller share of negative anti-inflationary demand effects (see Chart 9). This conclusion – where observed inflation, including the outlook, is distinctly closer to the simulations of the 100% supply shock – applies to a similar extent to all the economies under review. Differences in the extent and course of the inflation response in the individual countries to supply and demand shocks compared to the observed data mainly reflect the different sizes of the observed declines in GDP (alternatively explained by hypothetical scenarios) and the different impacts of individual economies' observed exchange rates and the degree of pass-through of the exchange rate to import prices and its effect on domestic inflation. Another difference is the different room for central banks' response before the onset of

Chart 9a – Comparison of observed inflation, including the outlook, with simulations of hypothetical scenarios of the price impacts of the drop in GDP in 2020 corresponding to a 100% demand shock and a 100% supply shock: USA



Note: Vertical lines in charts show outlooks.
Source: Authors' calculations.

Chart 9b – Comparison of observed inflation, including the outlook, with simulations of hypothetical scenarios of the price impacts of the drop in GDP in 2020 corresponding to a 100% demand shock and a 100% supply shock: eurozone

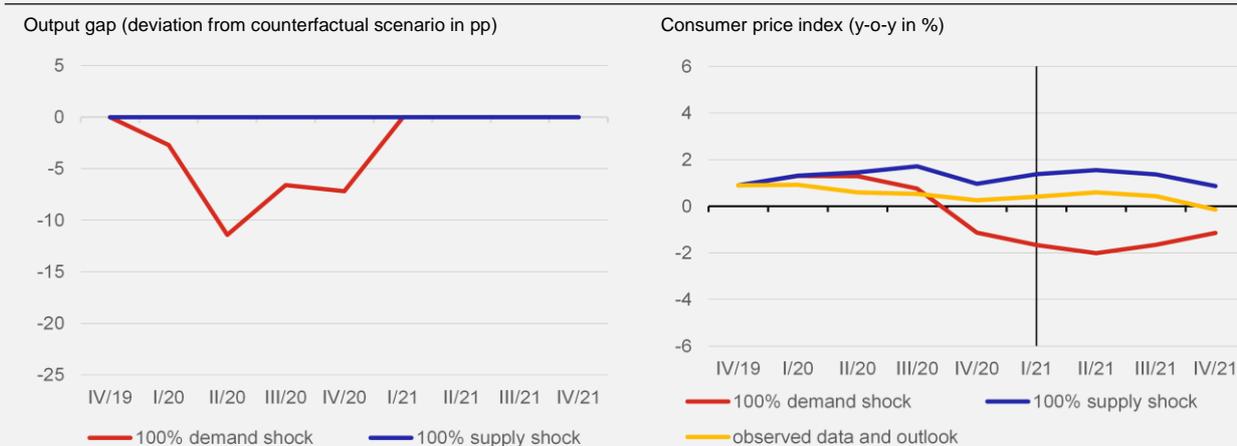


Note: Vertical lines in charts show outlooks.
Source: Authors' calculations.

the coronavirus pandemic in the form of monetary policy easing via interest rates in the 100% negative demand shock scenario.¹¹ The model assumption of an exogenous shock to oil prices, reflecting the sharp fall observed last year, was the same for all simulations.

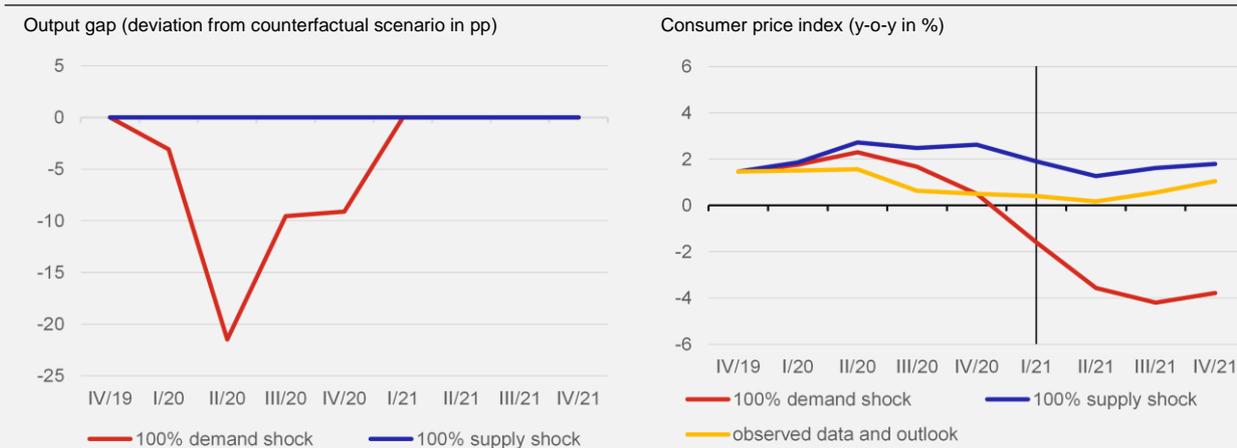
The current developments, which mainly reflect the negative impacts of anti-epidemic measures offset by extensive fiscal support programmes, thus largely bear the hallmarks of a negative supply shock. This result is also in line with the interpretation of the trend in the NIGEM model as a production function and its production factors (labour and capital) which approximate the total production capacity in the economy. Any disruptions to production capacity (government-imposed shutdowns of parts of the economy – lockdowns or other restrictions) are thus directly reflected in a drop in supply (trend). Although production factors in the economy are actually able to produce and thus still exist, they cannot be used effectively if restricted or shut completely. An unprecedented shock of this kind, the magnitude of which has never been seen before, thus has negative impacts mainly on supply, and is therefore inflationary in nature. A drop in

Chart 9c – Comparison of observed inflation, including the outlook, with simulations of hypothetical scenarios of the price impacts of the drop in GDP in 2020 corresponding to a 100% demand shock and a 100% supply shock: Japan



Note: Vertical lines in charts show outlooks.
Source: Authors' calculations.

Chart 9a – Comparison of observed inflation, including the outlook, with simulations of hypothetical scenarios of the price impacts of the drop in GDP in 2020 corresponding to a 100% demand shock and a 100% supply shock: United Kingdom



Note: Vertical lines in charts show outlooks.
Source: Authors' calculations.

¹¹ Due to the uncertainty regarding the exact quantification and impacts, the simulations do not explicitly include the effects of monetary policy easing using unconventional instruments commonly performed by the central banks of these selected economies in different forms and to different extents. All easing of monetary conditions is thus contained in the simulations as an endogenous response within the interest rate component and the observed evolution of the exchange rate.

economic activity, especially in the first phase of the shock, can thus be explained by a drop in supply. This subsequently also affected demand which could not be fully satisfied at the time despite being, at least initially, very solid.¹² The drop in supply thus manifested itself in a sharp rise in the saving rate of households in the individual economies.

Conclusion

The unprecedented size and nature of the shock dealt by the coronavirus pandemic meant that it was difficult to estimate the structure of supply and demand factors, especially at the start. This fundamental uncertainty is reflected in a great diversity of estimates of the magnitude of the negative output gap produced by central banks and international institutions. Through the lens of a decomposition of GDP into the output gap relative to trend, some institutions likened – at least initially – the development of coronavirus pandemic to the global financial and economic crisis. However, unlike a biological crisis such as a pandemic, the global financial and economic crisis was triggered by factors within the economic system, and its interpretation and consequences in the form of anti-inflationary developments were clearly cyclical. The observed data show that the coronavirus pandemic – just like any other natural disaster – has had standard adverse stagflationary supply-side effects so far. Unlike earthquakes or floods, which are usually local and are short-lived, a natural crisis such as a pandemic is global and long-lasting. Although a pandemic does not directly physically damage production capacities (trend), production shutdowns or restrictions under anti-epidemic measures have ultimately the same effect on the trend, as these production capacities cannot be used in practice. On the other hand, they can be very quickly renewed after the adverse epidemic situation improves, which is reflected in great volatility of the trend. Therefore, statistical filters, which are often used to estimate the trend and output gap, may – due to their two-tailed nature – lead to misleading conclusions in the case of biological crises.

Our analyses prove that the coronavirus pandemic is largely a negative supply shock. This conclusion thus confirms the fundamental difference between the coronavirus pandemic and the global financial and economic crisis which, by contrast, was largely characterised by negative anti-inflationary demand effects. This difference was also observed in household behaviour. Whereas during the global financial and economic crisis, household consumption and willingness to spend were reduced mainly due to a higher degree of caution reflecting negative consumer sentiment, during the pandemic this is chiefly due to administrative decisions to restrict or completely close retail and services. To assess the structure of the supply and demand factors during the coronavirus pandemic, in a first step we conducted an empirical analysis comparing the dynamics of economic activity and inflation using data on the world's four largest advanced economies (the USA, the euro area, Japan and the United Kingdom). Its conclusions confirmed that although the drop in economic activity in 2020 was much deeper than during the global financial and economic crisis, unlike more than ten years ago, no strong deflationary pressures have been recorded for the coronavirus crisis so far. Simulations using the global NIGEM model also indicate a completely different mix of supply and demand factors and the interpretation of the coronavirus pandemic-induced crisis as being largely a supply crisis manifesting itself in an inflationary effect.

This assessment of the current macroeconomic developments has such strong price consequences and hence also major monetary policy implications. Any misinterpretation of the impacts of the coronavirus pandemic as exclusively negative demand effects could lead to a more significant overshooting of central banks' inflation targets if they continued to maintain excessively accommodative monetary policy. At the same time, however, this assessment does not rule out the possibility that the structure of supply and demand factors and the corresponding price developments will change gradually in the future depending on the effects of endogenous economic mechanisms which are cyclical in nature.

Sources

Andrle, M., Brůha, J., Solmaz, S. (2013). Inflation and Output Comovement in the Euro Area: Love at Second Sight? IMF Working Paper WP/13/192.

Andrle, M., Brůha, J., Solmaz, S. (2016). Output and Inflation Co-movement; An Update on Business-Cycle Stylized Facts. IMF Working Papers 2016/241.

Babecká, O., Brůha, J. (2020). [A tale of two crises: An early comparison of foreign trade and economic activity in EU countries](#). Global Economic Outlook, Czech National Bank, September.

Ball, L., Mazumder, S. (2019). The Nonpuzzling Behavior of Median Inflation. NBER Working Papers 25512,.

Ball, L., Mazumder, S. (2020). A Phillips curve for the euro area. ECB Working paper No 2354.

Blanchard, O., Quah, D. (1989). The Dynamic Effects of Aggregate Demand and Supply Disturbances, *American Economic Review* 79(4), pp. 655-673.

Bodnár, K., Roux, J. L., Lopez-Garcia, P., Szörfi, B. (2020). The impact of COVID-19 on potential output in the euro area. ECB Economic Bulletin, Issue 7/2020.

Christiano, L., & Fitzgerald, T. (2003). The bandpass filter. *International Economic Review*, stránky 435-465.

¹²A sharp drop in consumption, investment and exports triggered primarily by sudden administrative restrictions on supply is reflected in a distinctly weaker anti-inflationary effect than was the standard negative demand shock observed, for example, during the 2009 crisis, which was a standard (albeit exceptionally deep) crisis stemming from overproduction/underconsumption of the economies affected.

Hamilton, J. (2018). Why You Should Never Use the Hodrick-Prescott Filter. *The Review of Economics and Statistics*, 100(5), pp. 831-843, December.

Hantzsche, A., Lopresto, M., & Young (2020). *Using NiGEM in uncertain times: Introduction and overview of NiGEM*. Cambridge University Press.

Motl, M. (2020). [Impacts of the COVID-19 pandemic on the world economy](#). *Global Economic Outlook*, Czech National Bank, April.

Keywords

Output gap, inflation, supply and demand shock, coronavirus crisis

JEL Classification

E31, E32, F47

A1. Change in predictions for 2021

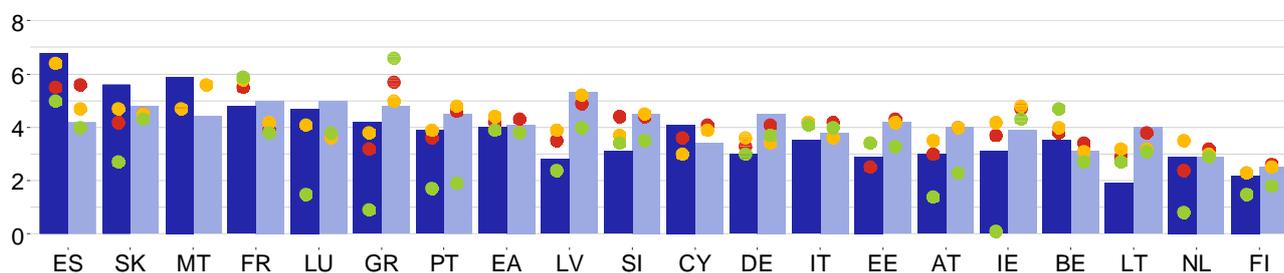
	GDP growth, %				Inflation, %			
	CF	IMF	OECD	CB / EIU	CF	IMF	OECD	CB / EIU
EA	0	+0.2	+0.3	+0.1	+0.1	+0.5	+0.2	+0.5
US	+0.4	+1.3	+3.3	+2.3	+0.2	-0.5	+0.4	+0.6
UK	+0.6	+0.8	+0.9	+2.3	0	+0.3	+0.1	+0.5
JP	0	+0.2	+0.4	+0.1	0	-0.2	+0.3	-0.4
CN	0	+0.3	-0.2	0	0	-1.5	+0.4	0
RU	+0.2	+0.8	-0.1	+0.2	+0.4	+1.3	+0.1	+0.7

A2. Change in predictions for 2022

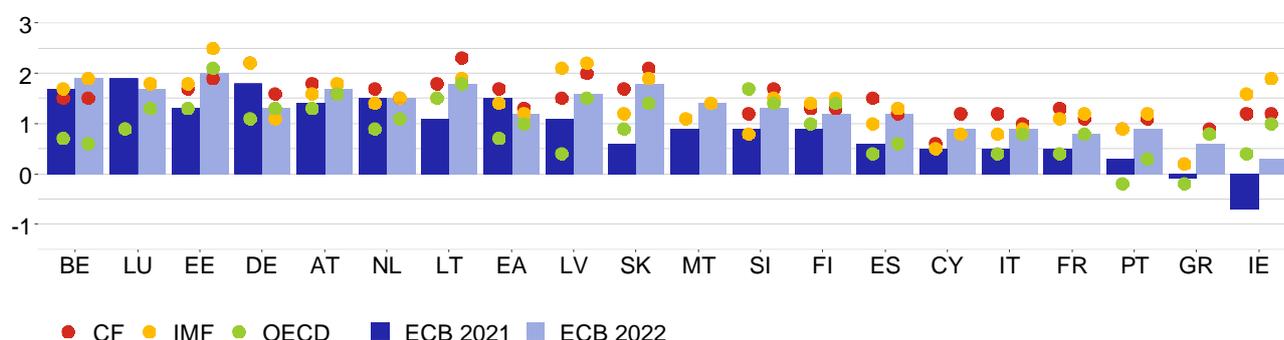
	GDP growth, %				Inflation, %			
	CF	IMF	OECD	CB / EIU	CF	IMF	OECD	CB / EIU
EA	0	+0.2	+0.5	-0.1	0	0	--	+0.1
US	+0.1	+1.0	+0.5	+0.1	0	+0.3	--	+0.1
UK	-0.2	+0.1	+0.6	-1.5	+0.1	+0.2	--	-0.3
JP	+0.2	+0.1	+0.3	+0.6	0	0	--	+0.1
CN	+0.1	0	0	+0.2	0	-0.7	--	0
RU	+0.1	-0.1	+0.4	0	+0.1	+0.2	--	-0.2

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

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



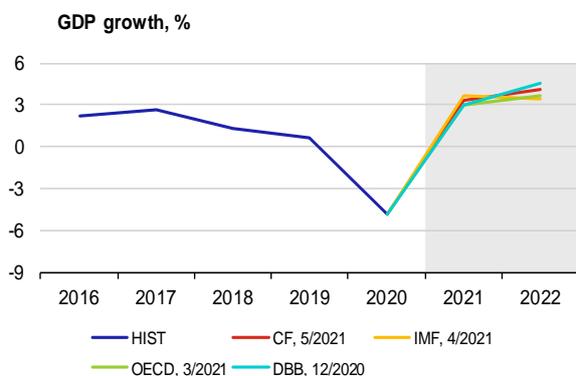
Inflation in the euro area countries in 2021 and 2022, %



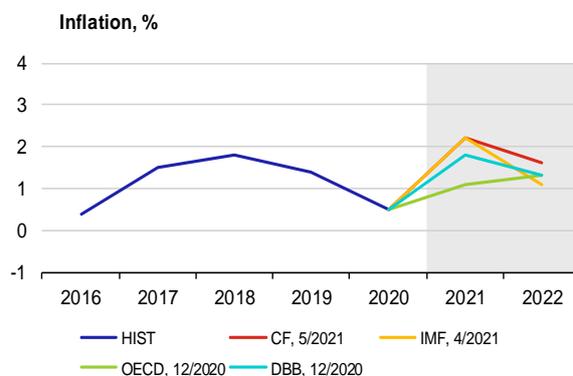
Note: Charts show institutions' latest available outlooks of for the given country.

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

Germany

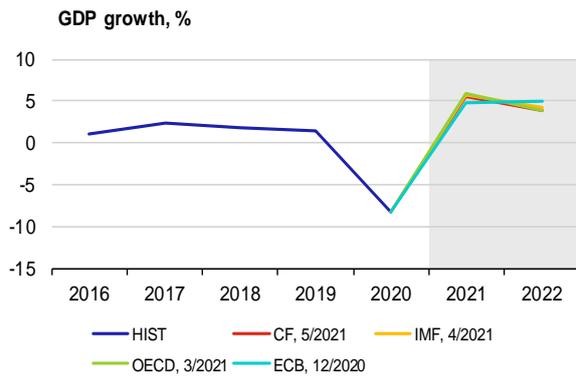


	CF	IMF	OECD	DBB
2021	3.3	3.6	3.0	3.0
2022	4.1	3.4	3.7	4.5

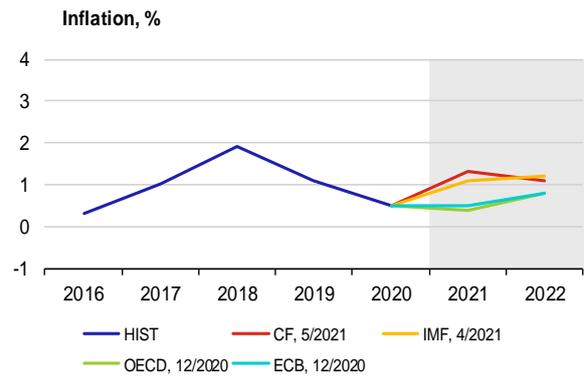


	CF	IMF	OECD	DBB
2021	2.2	2.2	1.1	1.8
2022	1.6	1.1	1.3	1.3

France

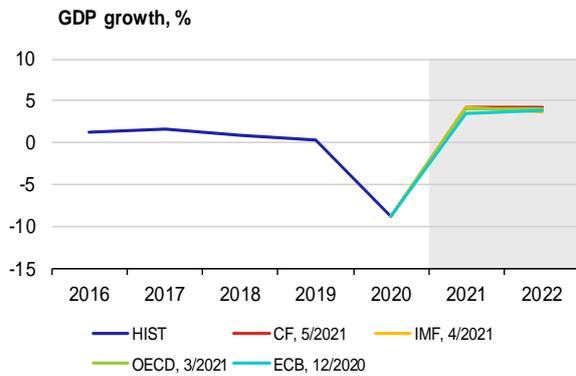


	CF	IMF	OECD	ECB
2021	5.5	5.8	5.9	4.8
2022	3.9	4.2	3.8	5.0

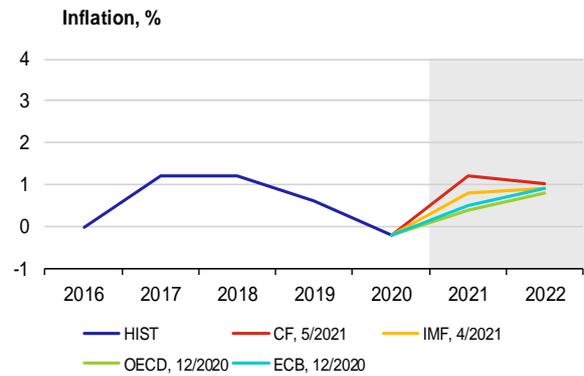


	CF	IMF	OECD	ECB
2021	1.3	1.1	0.4	0.5
2022	1.1	1.2	0.8	0.8

Italy

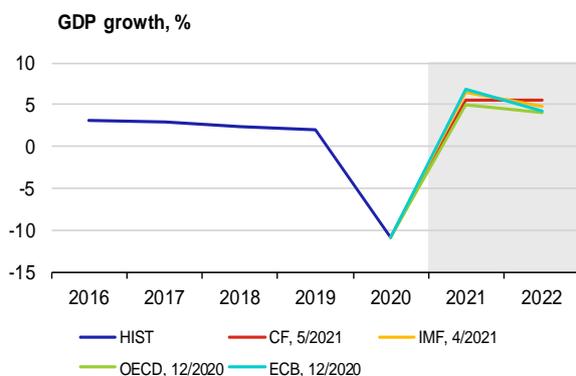


	CF	IMF	OECD	ECB
2021	4.2	4.2	4.1	3.5
2022	4.2	3.6	4.0	3.8

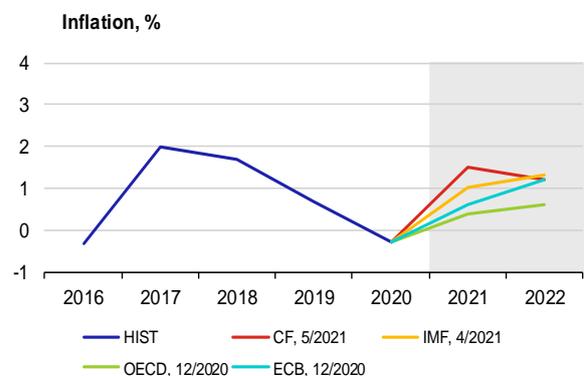


	CF	IMF	OECD	ECB
2021	1.2	0.8	0.4	0.5
2022	1.0	0.9	0.8	0.9

Spain

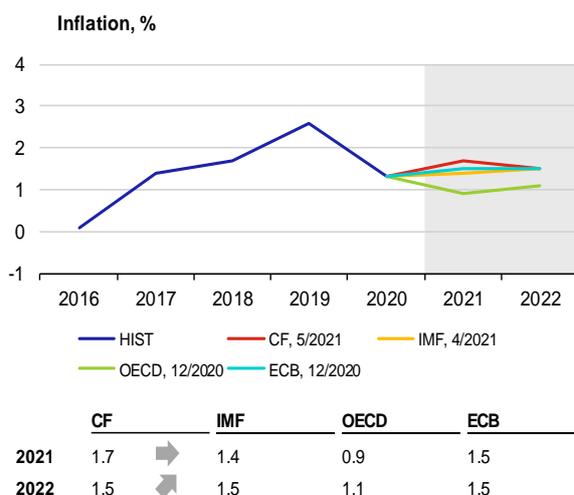
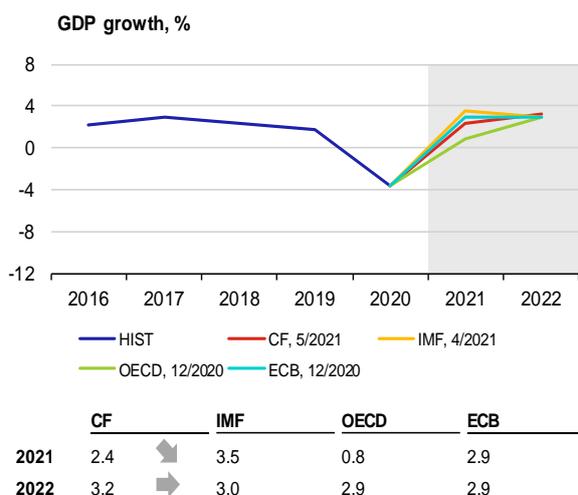


	CF	IMF	OECD	ECB
2021	5.5	6.4	5.0	6.8
2022	5.6	4.7	4.0	4.2

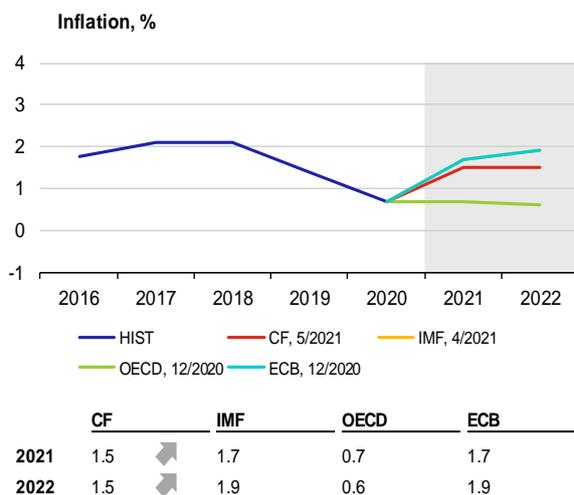
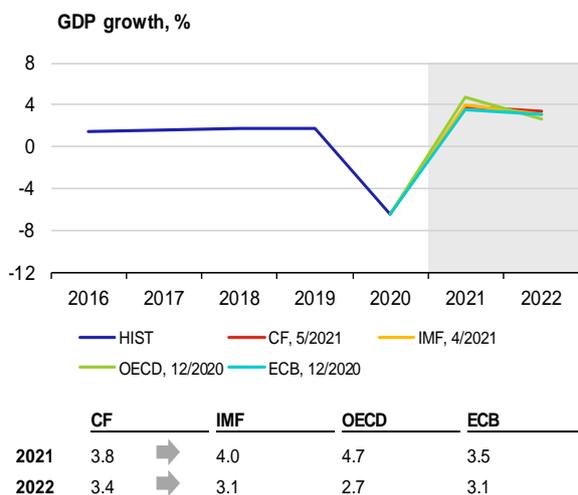


	CF	IMF	OECD	ECB
2021	1.5	1.0	0.4	0.6
2022	1.2	1.3	0.6	1.2

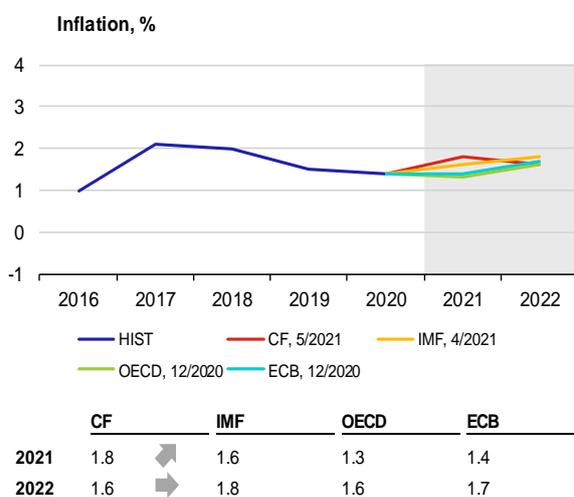
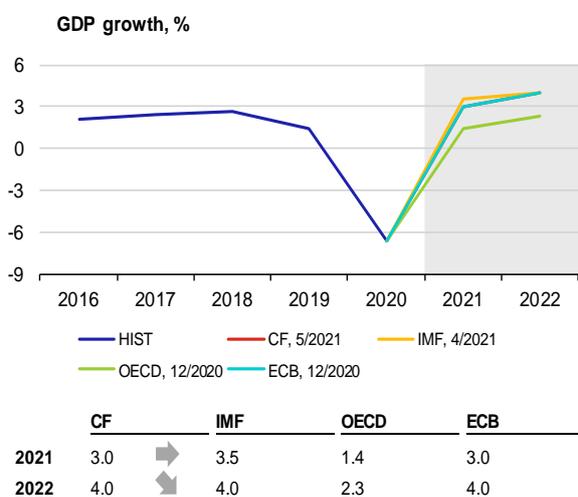
Netherlands



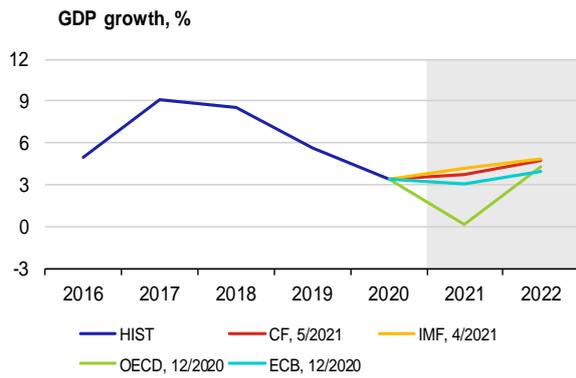
Belgium



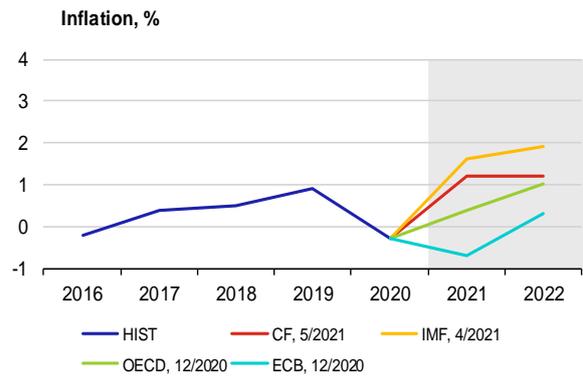
Austria



Ireland

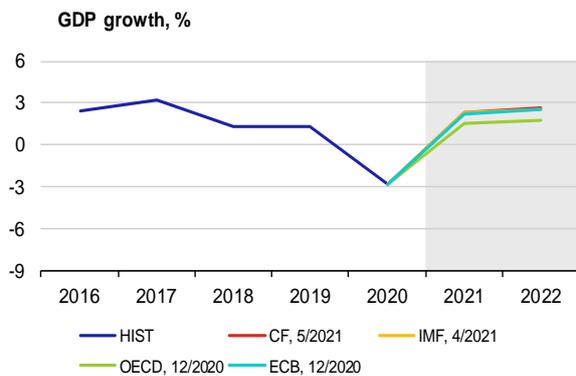


	CF	IMF	OECD	ECB
2021	3.7	4.2	0.1	3.1
2022	4.7	4.8	4.3	3.9

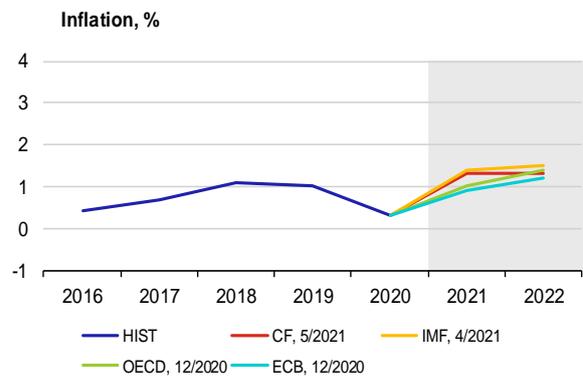


	CF	IMF	OECD	ECB
2021	1.2	1.6	0.4	-0.7
2022	1.2	1.9	1.0	0.3

Finland

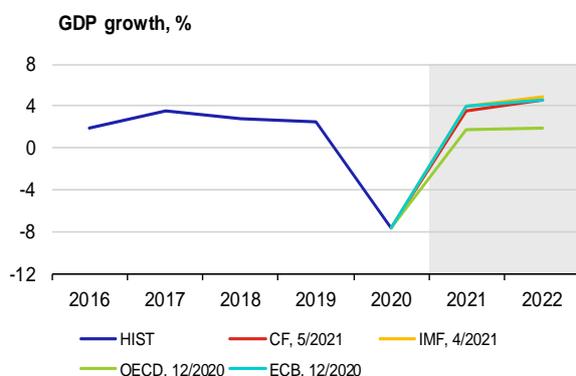


	CF	IMF	OECD	ECB
2021	2.3	2.3	1.5	2.2
2022	2.6	2.5	1.8	2.5

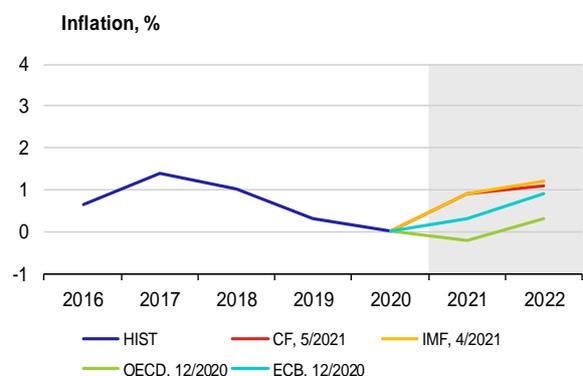


	CF	IMF	OECD	ECB
2021	1.3	1.4	1.0	0.9
2022	1.3	1.5	1.4	1.2

Portugal

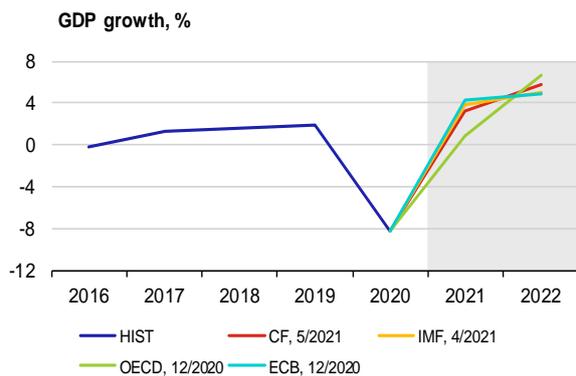


	CF	IMF	OECD	ECB
2021	3.6	3.9	1.7	3.9
2022	4.6	4.8	1.9	4.5

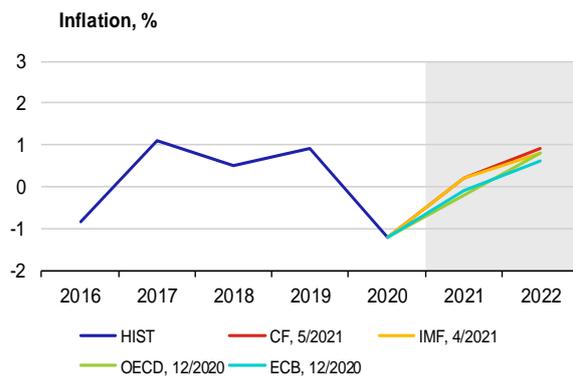


	CF	IMF	OECD	ECB
2021	0.9	0.9	-0.2	0.3
2022	1.1	1.2	0.3	0.9

Greece

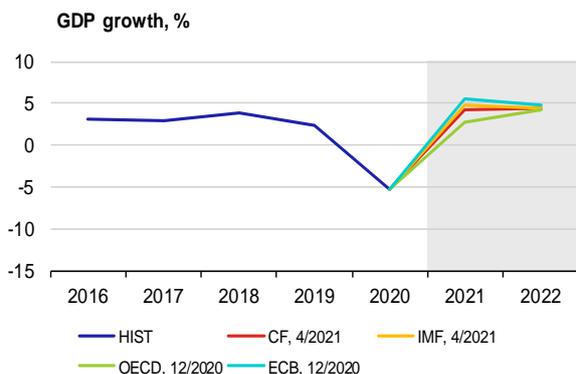


	CF	IMF	OECD	ECB
2021	3.2	3.8	0.9	4.2
2022	5.7	5.0	6.6	4.8

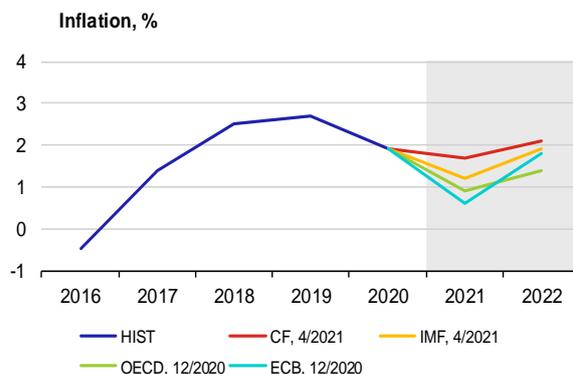


	CF	IMF	OECD	ECB
2021	0.2	0.2	-0.2	-0.1
2022	0.9	0.8	0.8	0.6

Slovakia

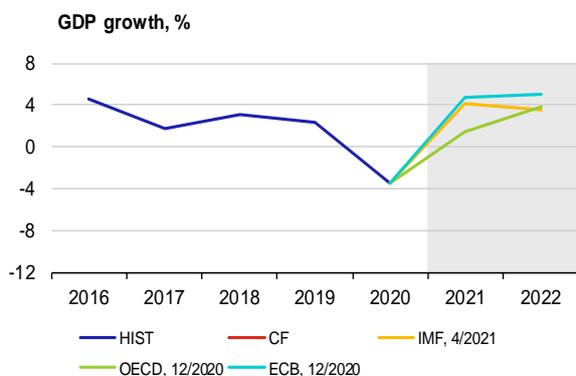


	CF	IMF	OECD	ECB
2021	4.2	4.7	2.7	5.6
2022	4.5	4.5	4.3	4.8

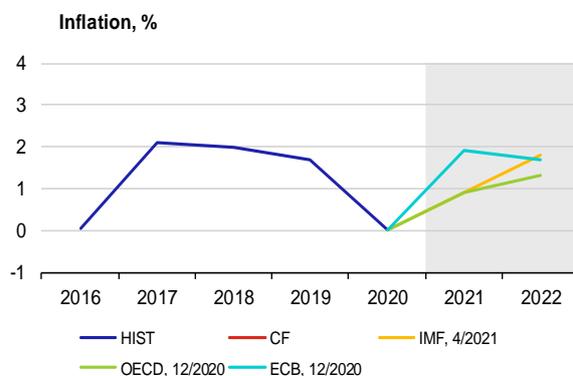


	CF	IMF	OECD	ECB
2021	1.7	1.2	0.9	0.6
2022	2.1	1.9	1.4	1.8

Luxembourg

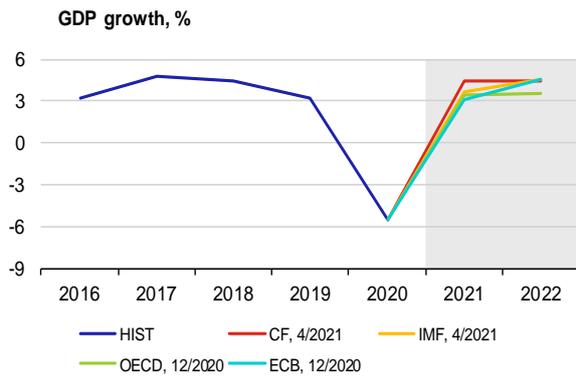


	CF	IMF	OECD	ECB
2021	n. a.	4.1	1.5	4.7
2022	n. a.	3.6	3.8	5.0

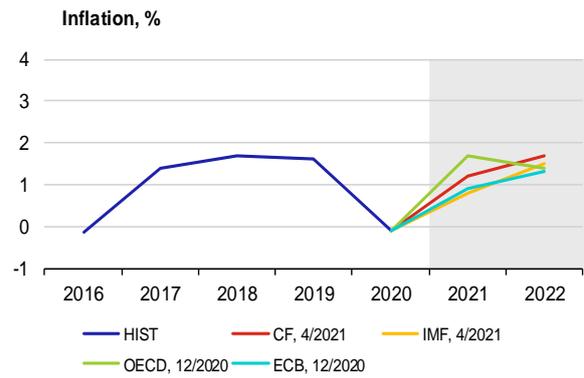


	CF	IMF	OECD	ECB
2021	n. a.	0.9	0.9	1.9
2022	n. a.	1.8	1.3	1.7

Slovenia

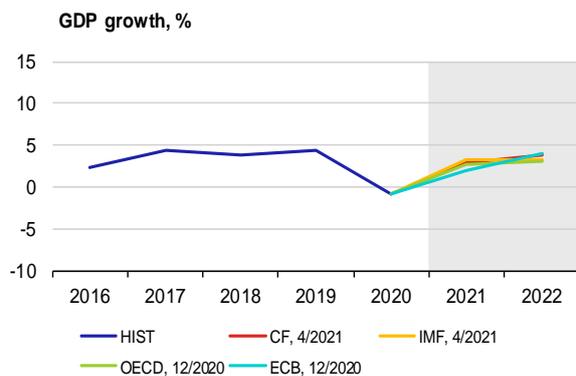


	CF	IMF	OECD	ECB
2021	4.4	3.7	3.4	3.1
2022	4.4	4.5	3.5	4.5

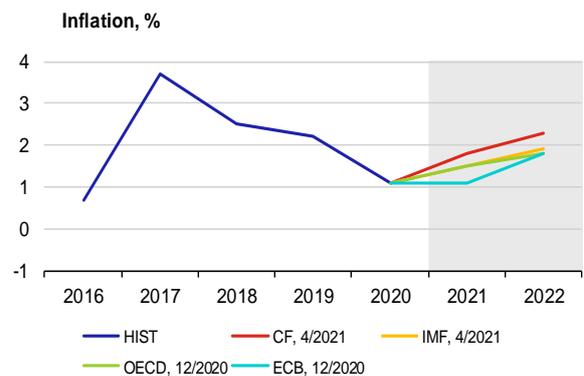


	CF	IMF	OECD	ECB
2021	1.2	0.8	1.7	0.9
2022	1.7	1.5	1.4	1.3

Lithuania

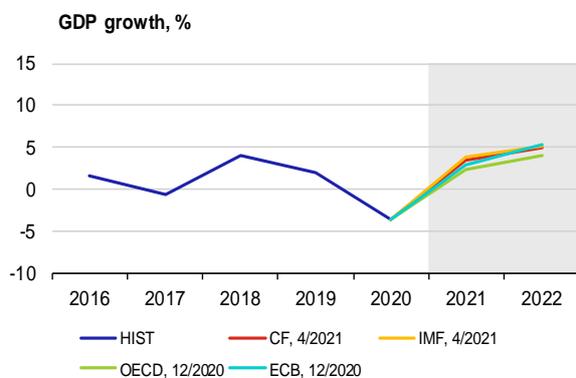


	CF	IMF	OECD	ECB
2021	2.9	3.2	2.7	1.9
2022	3.8	3.2	3.1	4.0

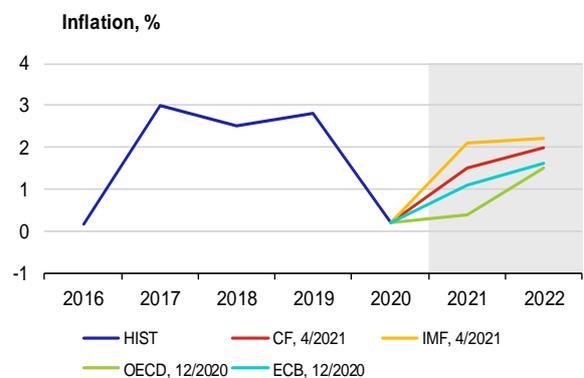


	CF	IMF	OECD	ECB
2021	1.8	1.5	1.5	1.1
2022	2.3	1.9	1.8	1.8

Latvia

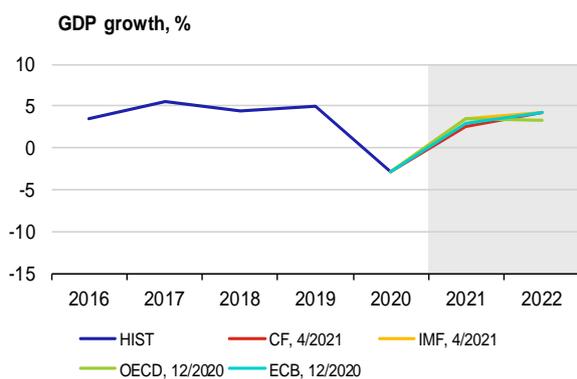


	CF	IMF	OECD	ECB
2021	3.5	3.9	2.4	2.8
2022	4.9	5.2	4.0	5.3

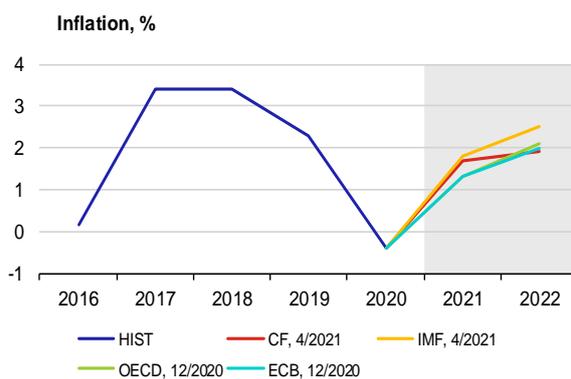


	CF	IMF	OECD	ECB
2021	1.5	2.1	0.4	1.1
2022	2.0	2.2	1.5	1.6

Estonia

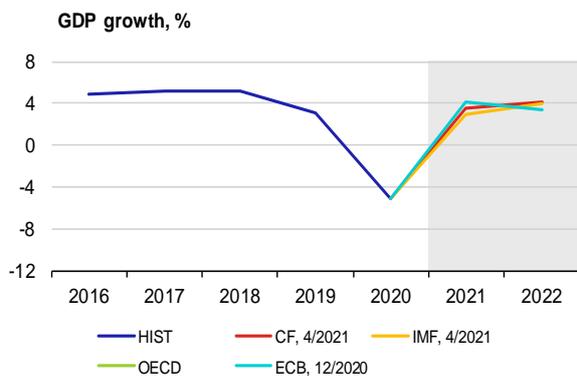


	CF	IMF	OECD	ECB
2021	2.5	3.4	3.4	2.9
2022	4.3	4.2	3.3	4.2

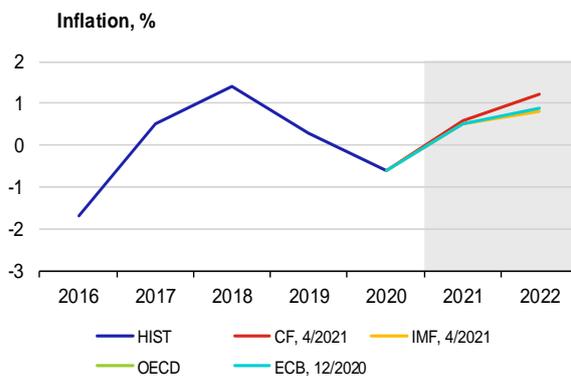


	CF	IMF	OECD	ECB
2021	1.7	1.8	1.3	1.3
2022	1.9	2.5	2.1	2.0

Cyprus



	CF	IMF	OECD	ECB
2021	3.6	3.0	n. a.	4.1
2022	4.1	3.9	n. a.	3.4

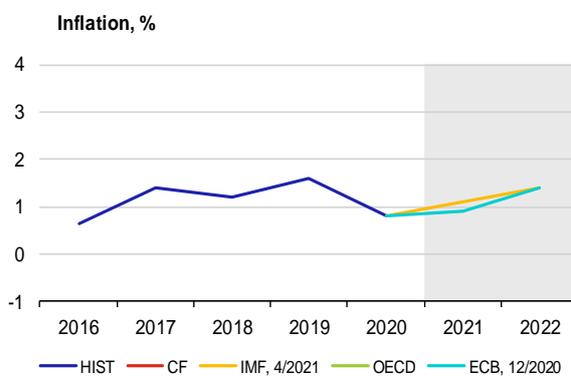


	CF	IMF	OECD	ECB
2021	0.6	0.5	n. a.	0.5
2022	1.2	0.8	n. a.	0.9

Malta



	CF	IMF	OECD	ECB
2021	n. a.	4.7	n. a.	5.9
2022	n. a.	5.6	n. a.	4.4

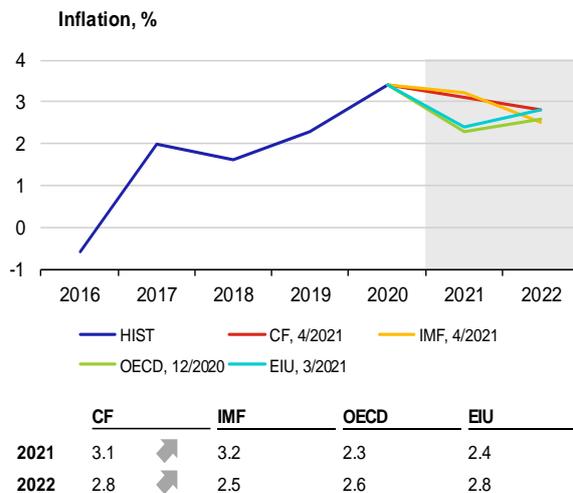
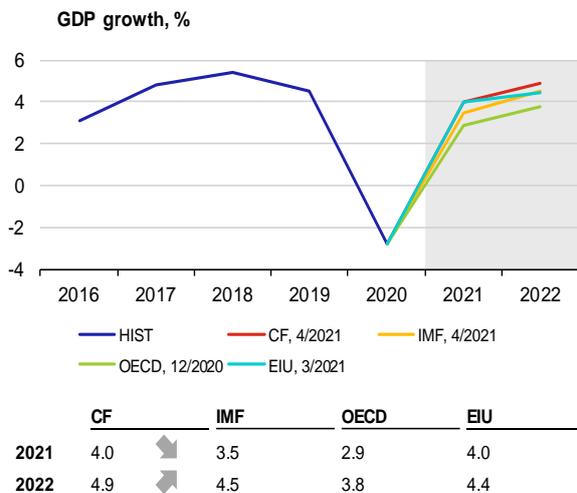


	CF	IMF	OECD	ECB
2021	n. a.	1.1	n. a.	0.9
2022	n. a.	1.4	n. a.	1.4

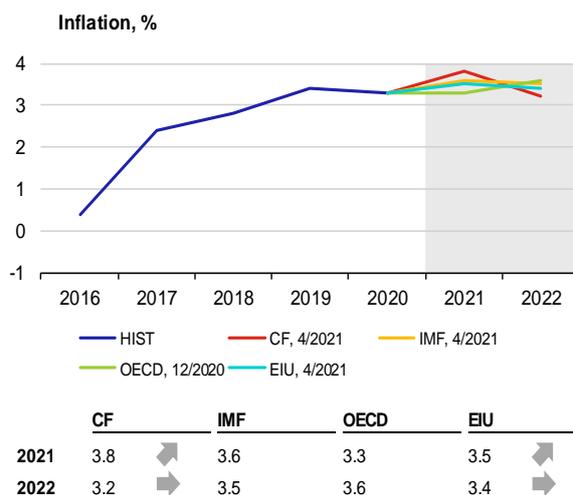
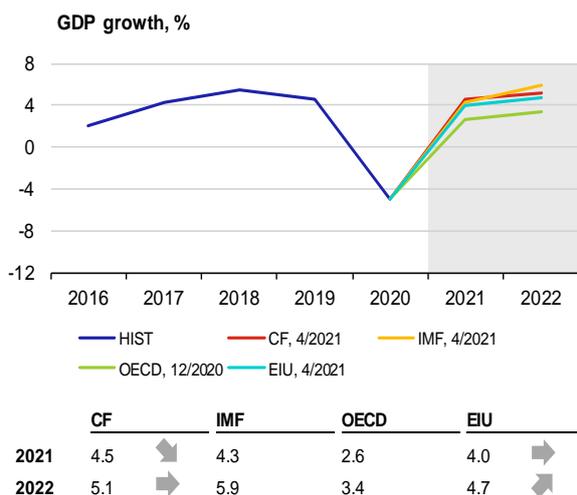
Ddd

A5. GDP growth and inflation in other selected countries

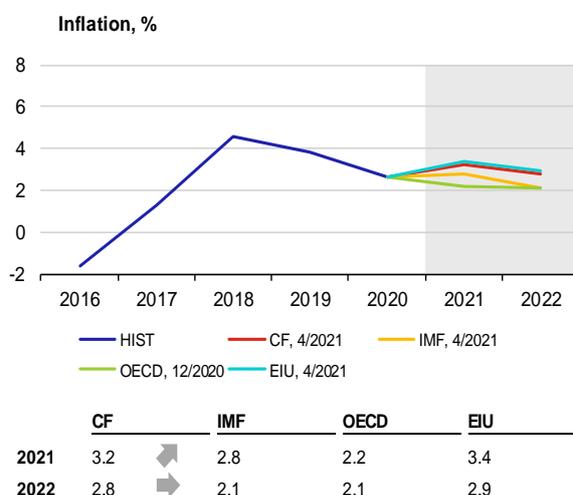
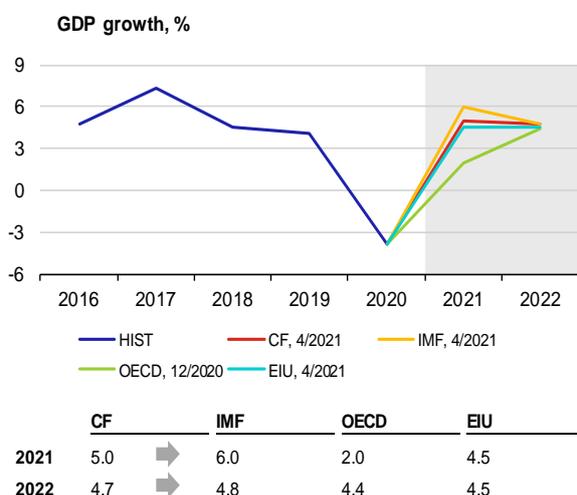
Poland



Hungary



Romania



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	PMI	Purchasing Managers' Index
EIU	Economist Intelligence Unit	pp	percentage point
ES	Spain	PT	Portugal
ESI	Economic Sentiment Indicator of the European Commission	QE	quantitative easing
EU	European Union	RU	Russia
EUR	euro	RUB	Russian rouble
EURIBOR	Euro Interbank Offered Rate	SI	Slovenia
Fed	Federal Reserve System (the US central bank)	SK	Slovakia
FI	Finland	UK	United Kingdom
FOMC	Federal Open Market Committee	UoM	University of Michigan Consumer Sentiment Index - present situation
FR	France	US	United States
FRA	forward rate agreement	USD	US dollar
FY	fiscal year	USDA	United States Department of Agriculture
GBP	pound sterling	WEO	World Economic Outlook
GDP	gross domestic product	WTI	West Texas Intermediate (crude oil used as a benchmark in oil pricing)
GR	Greece	ZEW	Centre for European Economic Research
ICE	Intercontinental Exchange		
IE	Ireland		
IEA	International Energy Agency		

Publisher:
ČESKÁ NÁRODNÍ BANKA
Na Příkopě 28
115 03 Praha 1
Česká republika

Contact:
ODBOR KOMUNIKACE SEKCE KANCELÁŘ
Tel.: 224 413 112
Fax: 224 412 179
www.cnb.cz