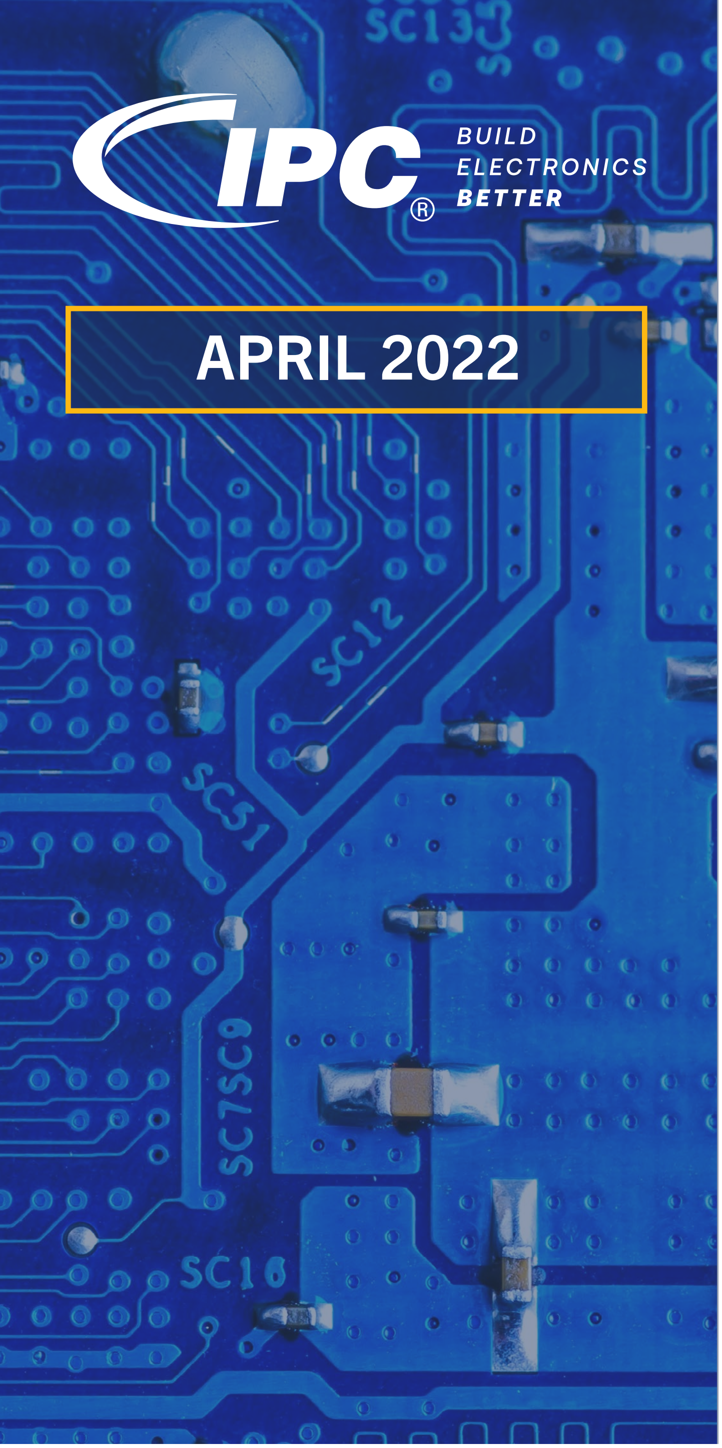
BUILD ELECTRONICS BETTER



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SHAWN DUBRAVAC, PHD
CHIEF ECONOMIST
shawndubravac@ipc.org

ECONOMIC OUTLOOK

Russia's invasion of Ukraine continues to dominate headlines. While it is not the only risk that we need to watch, the fallout continues to have significant economic implications. Unsurprisingly, the economic impact will be most severely felt in Europe. We've shaved nearly one percentage point off of our GDP forecast for Europe and a prolonged conflict, or a further exacerbation of the situation could lead to a further write-down. In the US we've lowered our forecast for this year by two-tenths of a percentage point. We now expect the U.S. economy to grow by 3.5% in 2022.

The conflict is impacting the economy in several ways. First, energy prices have risen significantly. This is putting upward pressure on already elevated rates of inflation in much of the world. Secondly, the conflict has driven commodity prices higher – many hitting new all-time highs in the past few weeks. Metals like copper, palladium, nickel, aluminum, and zinc all reached historic highs in March. Thirdly, the uncertainty lowers confidence which will reduce spending by consumers and investment by businesses. Finally, the impact of bidirectional sanctions will slow economic growth. These four forces combine to lower economic activity in the months to follow.

It is important to understand energy and commodity prices are up so significantly for three primary reasons: perceived potential shortages, increased stockpiling, and speculative buying amidst the uncertainty. In some instances, prices are up because Russia and Ukraine are major suppliers of the commodity and there is concern shortages will ensue. For example, wheat hit an all-time high in March. Russia is the largest exporter of wheat and Ukraine was the world's sixth-largest exporter of wheat last year. Together they make up more than a quarter of the world's wheat export.

In some instances, prices are up because demand has risen and businesses are stockpiling in the face of uncertainty. This is likely aggravated by already tight supply chains and extremely low inventory levels. Neither Russia nor Ukraine are major exporters of copper but prices are up as companies preemptively buy. Geopolitical uncertainty causes manufacturers to place larger orders and, in some cases, hoard a little extra inventory of key components and commodities for fear that the geopolitical environment will deteriorate further and some of these resources will become more difficult to obtain. Overall, the Thomson Reuters CRB index comprising 21 commodities has increased by over 15%. Higher prices are putting upward pressure on inflation and already strained supply chains.

Europe is likely to see higher prices and worse supply for some resources because it sources more heavily from Russia and

Ukraine than the United States. For example, natural gas prices in Europe initially shot up 80% amidst fear of restricted supply. The US is the second-largest producer of oil and sources very few energy commodities from Russia. But it's also the case that commodities trade in global markets so when prices are up, they are up everywhere. While certain commodities are more heavily sourced from Russia and Ukraine and as a result some commodities will become scarcer, the broader impact is elevated prices.

It's also the case in Europe that transportation costs will rise and become more encumbered. Transportation costs will rise globally because of higher fuel costs. But it's also the case that Russia is a key transit route for European-related transportation. Flights between Europe and Asia will have to route around Russia because Russia has closed its airspace after Europe did the same. The rail freight corridor between Europe and Asia typically involves some transit through Russian territory. Cargo that was transported between China and Europe via rail will now need to be transported either via sea or air. As a result, both air freight and containerized marine freight costs will rise for Europe.

Both Europe and the US economies are, at least for now, on solid footing. They are well-positioned to weather the negative shock of the war but growth will be hindered.

While most headlines are focused on the implication of the war on economic growth, it is not the only risk we should be worried about. Another key risk to the economy is the impact of high inflation rates. Last month the Federal Reserve initiated its first-rate hike. The Fed also signaled six more rate increases are coming by the end of the year. These increases will bring the target fed funds rate to nearly 2%. Furthermore, another 3 to 4 rate increases are expected in 2023 which will push the target fed funds rate to just under 3%. Higher rates will slow demand which in turn will hopefully ease supply chain constraints and other supply chain dislocations. The Federal Reserve has set a very hawkish tone. With strong job growth and low unemployment, the Fed will be able to focus almost exclusively on battling inflation over the next 18 months. The European Central Bank (ECB) had also said a hawkish tone but it is now unclear how severe the spillover from the Russia-Ukraine war will be on economic growth in Europe. As a result, the ECB will have to be more tepid with rate hikes in the coming year.

There is some risk that the Federal Reserve will overshoot monetary tightening. Monetary policy works with a lag but given the current high rate of inflation, the Fed may not have the luxury of waiting for the full transmission of rate hikes to work their way through the economy. The Fed will have to watch closely the rate of the economic slowdown that takes place over the next year outside of any slowdown produced by restrictive monetary policy measures.

Another major risk for the electronics manufacturing supply chain is the rising COVID rates in China. China is battling its largest outbreak of COVID since the beginning of the pandemic. China has a very strong zero-COVID policy that it enforces by shutting down swaths of the economy when COVID outbreaks occur. Moreover, China has thus far relied on an inferior vaccination and has a very large population to vaccinate. In the last few weeks, China has authorized the use of Pfizer's Paxlovid, a Covid treatment pill, making the first time China has authorized a COVID vaccine or drug developed outside of China.

China recently announced that Shanghai would be locked down because of a high number of COVID cases in that city. In the last few weeks, we've seen shutdowns in other parts of the country that have impacted the electronics manufacturing supply chain. The rising COVID cases in

China could be a negative shock to production in China and supply chains elsewhere. There is a risk that COVID cases remain high in China for much of the year and result in lockdowns that slow production and exports of key components and products.

-7.2%

The Russian economy will experience a deep recession this year as a result of the war with Ukraine. We expect GDP to decline 7.2% in 2022.

15%

The Thomson Reuters CRB index comprising 21 commodities has increased by over 15%. Higher prices are putting upward pressure on inflation and already strained supply chains.

7.9%

The U.S. inflation rate is currently 7.9%. In Europe, prices are up 5.9% over the last year.

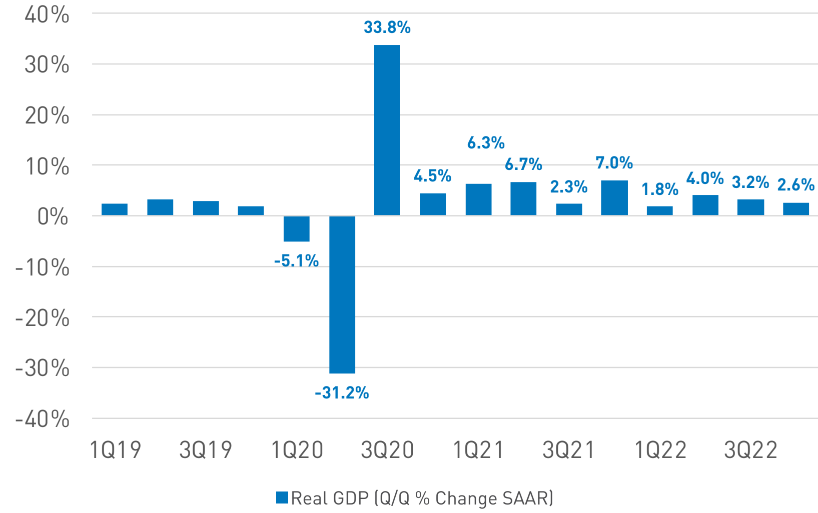
187,000

The current initial jobless claims are at a 53-year low, highlighting the tightness of the labor market.

U.S. OUTLOOK

ECONOMIC GROWTH

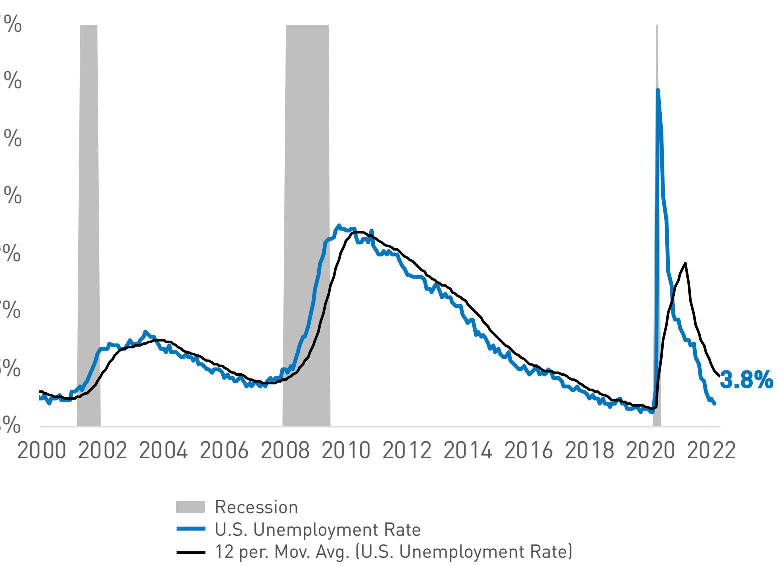
The U.S. economy is on track to expand just under 1% in the first quarter of 2022. This should be the weakest quarter of the year. This is after the economy grew 7% in the fourth quarter of 2021. The economy grew 5.6% for the full 2021 year, fueled in part by monetary and fiscal stimulus. This month we have lowered our expectations for economic growth in 2022 by two-tenths of a percentage point to 3.5%, driven in part by the spike in geopolitical uncertainty, higher energy prices, and continued supply challenges. These forces will combine to restrain economic activity. This is still respectable growth for the year. The economy should avoid a recession in 2022 and 2023, but the risk of a recession has increased somewhat over the last month.



	2022 ECONOMIC GROWTH (GDP % Change)	2023 ECONOMIC GROWTH (GDP % Change)	2022 EXCHANGE RATE (v. USD)	2023 EXCHANGE RATE (v. USD)
UNITED STATES	3.5%	2.5%	N/A	N/A
CANADA	3.7%	3.2%	1.26	1.25
MEXICO	2.0%	2.4%	20.93	21.19
EURO AREA	3.1%	2.5%	1.14	1.18
CHINA	5.2%	5.0%	6.45	6.40

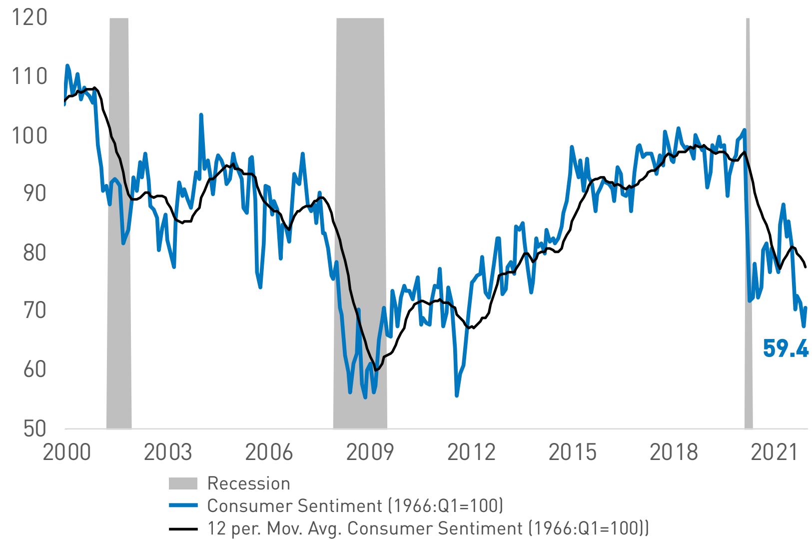
EMPLOYMENT

The U.S. economy added 678,000 new jobs in February, well above the expected 423,000 jobs. Results for December and January were also revised higher by 92,000 jobs. The largest increase in private sector jobs was in leisure & hospitality (179,000), professional & business services (95,000 jobs including temps), and health care & social assistance (94,000). Manufacturing added 36,000 new jobs in the month. The unemployment rate fell to 3.8% in February. The economy is still 2.1 million jobs short of pre-pandemic levels, but this gap should close later this year. Despite that figure, the job market is extremely tight. Hourly wages are up 5.1% from a year ago, lagging inflation, but historically strong.



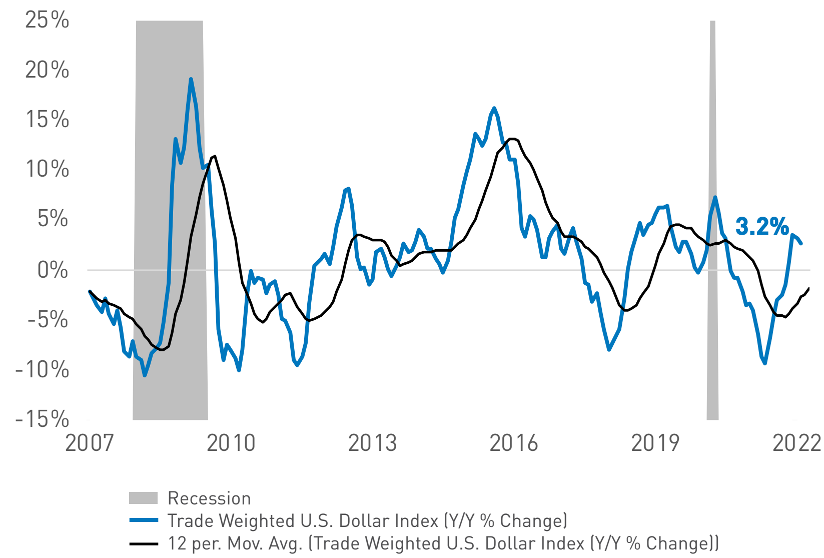
SENTIMENT

Consumer sentiment fell again last month, after deteriorating in both January and February. The decline in March was primarily driven by inflation concerns. Roughly a third of consumers expect their overall financial position to worsen in the year ahead, the highest level in the history of the survey dating back to the mid-1940s. Half of all households anticipate declines in inflation-adjusted income in the next year as a result of rising prices and less positive income expectations. Consumers remain optimistic about the strong job market while also concerned about inflation, which might suggest many employees will be active job seekers, looking for higher-paying opportunities.



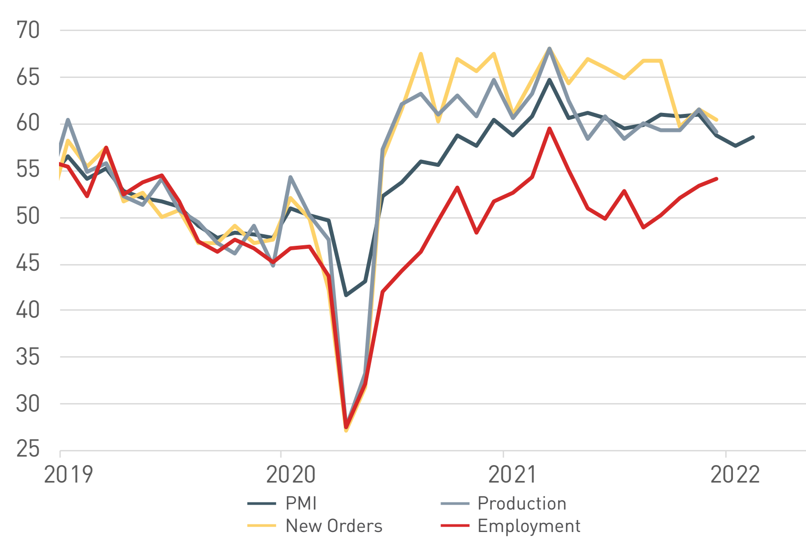
TRADE-WEIGHTED U.S. DOLLAR INDEX

The dollar strengthened sharply in the early half of March, driven by the Russian invasion of Ukraine and the Fed's first rate increase. The Fed has set a very hawkish tone in recent weeks and plans to increase its target Fed Funds rate another six times this year, followed by several additional increases next year. With a strong job market, the Fed can nearly exclusively focus on slowing inflation. Safe haven currencies like the U.S. dollar rallied in the immediate aftermath of the Russian invasion. The trade-weighted U.S. dollar index was flat in February and rose roughly 1.3% in March. The dollar's value is up about 2.7% over the last year. The dollar has strengthened notably against the Euro. The European Central Bank (ECB) had set a hawkish tone early on but the war's impact on the eurozone could shed up to one percentage point from GDP growth. This will force the ECB to be more tentative with its tightening plans.



MANUFACTURERS' SENTIMENT (PMI)

The U.S. manufacturing sector expanded in February — the 21st consecutive month of growth — and growth accelerated somewhat from the prior month. The New Orders Index rose 3.8 percentage points, while the Backlog of Orders Index increased 8.6% to historically high levels. Manufacturing demand remains strong, while supply chain constraints continue to hinder growth. Customers' Inventories Index fell in the last month and remains at very low levels. Manufacturers continue to also be hindered by high staff turnover.



U.S. END MARKETS FOR ELECTRONICS

Industrial production rose 0.5% in February and manufacturing output increased 1.2% during the month. Auto production continues to be challenged by supply chain shortages, falling 3% during the month while non-auto manufacturing rose 1.5%. The mining sector, which includes oil rigs, was up only 0.1% in February but should see strong gains in the months ahead. According to Baker Hughes, the number of oil and gas rigs in operation is still down 16% from pre-pandemic levels. This should reverse with oil now trading above $100/barrel.

AUTOMOTIVE PRODUCTS

Auto production fell 3% in February. While production is flat from a year ago, output is off 8.1% from pre-pandemic levels.

TRANSIT EQUIPMENT

Transit equipment production rose 1.6% over the last month. The sector is down 2.3% over the last year and down 1.4% from pre-pandemic levels.

INFORMATION PROCESSING & RELATED EQUIPMENT

Production in the information processing and related equipment sector increased 1.8% in the month. The sector is up 9% over the last year and 7.2% from two years ago.

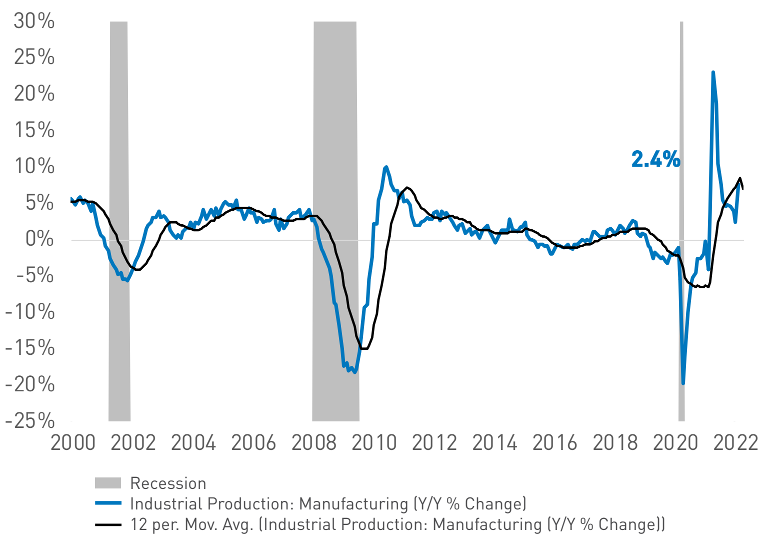
INDUSTRIAL & OTHER EQUIPMENT

The industrial sector moved 2% higher during the last month. The sector is up 9.3% over the last year and up 3.8% from the start of the pandemic.

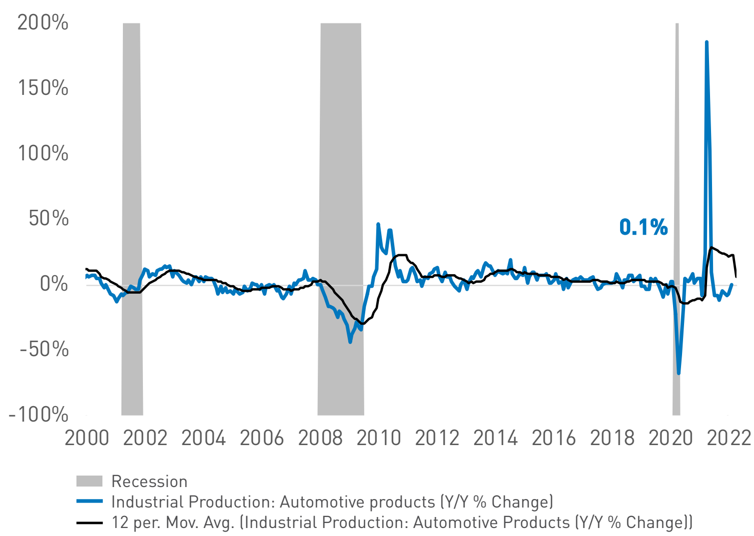
DEFENSE & SPACE EQUIPMENT

The defense and space equipment segment rose a strong 2.7% last month. The sector is up 14.7% over the last year and 22% over the last two years.

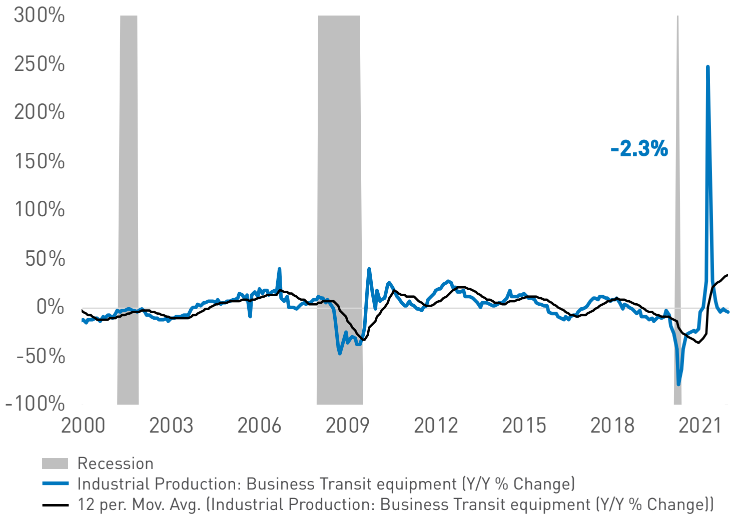
Manufacturing



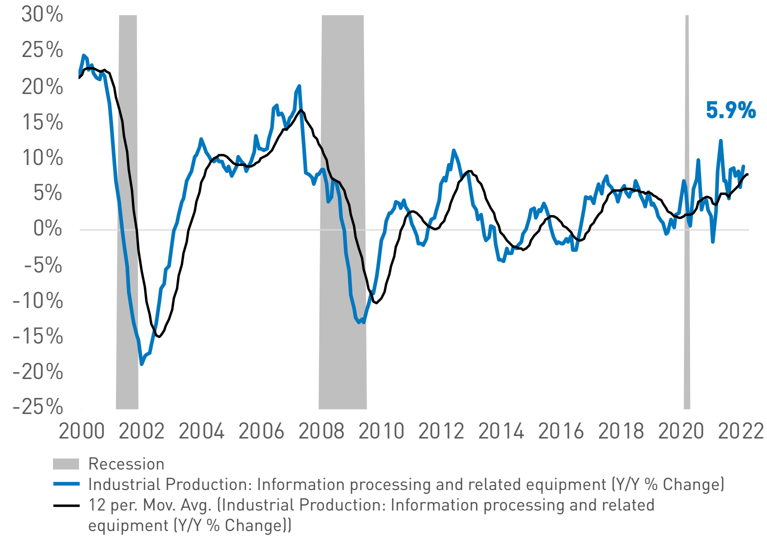
Automotive Products



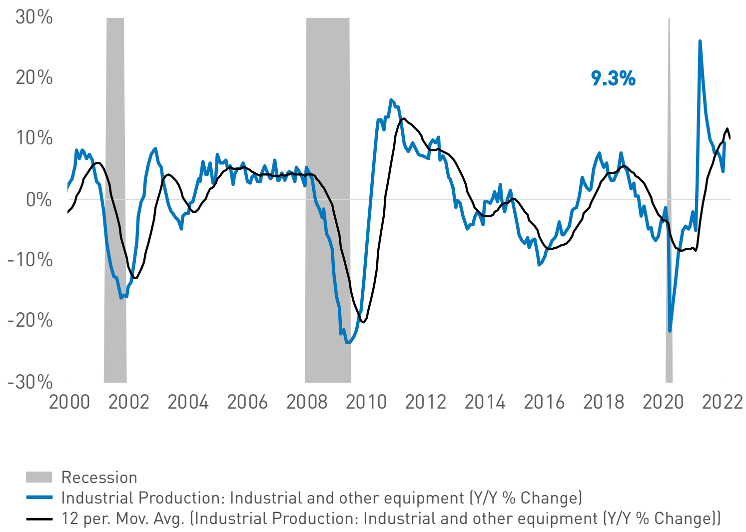
Business Transit Equipment (Y/Y % Change)



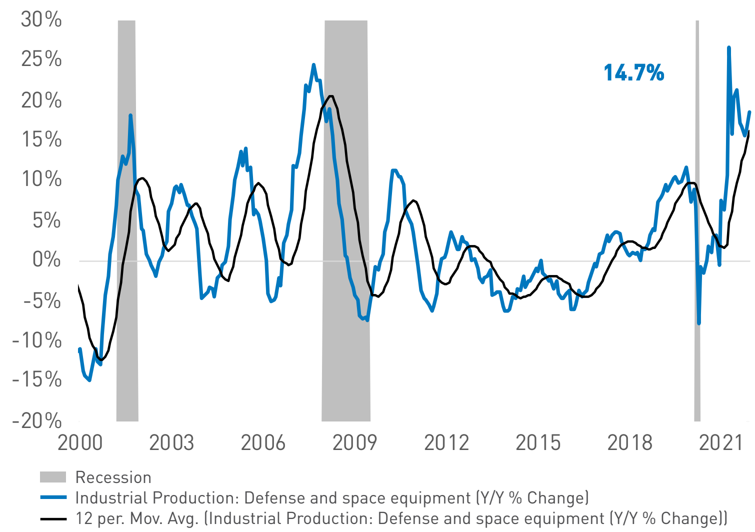
Information Processing & Related Equipment (Y/Y % Change)



Industrial & Other Equipment (Y/Y % Change)



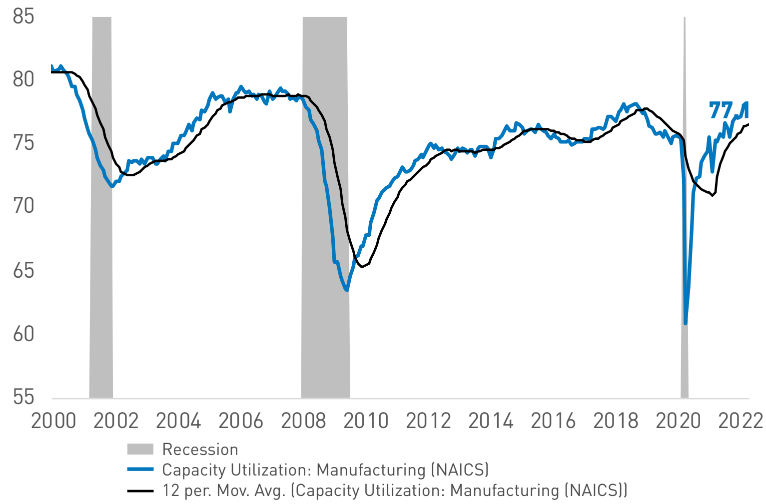
Defense & Space Equipment (Y/Y % Change)



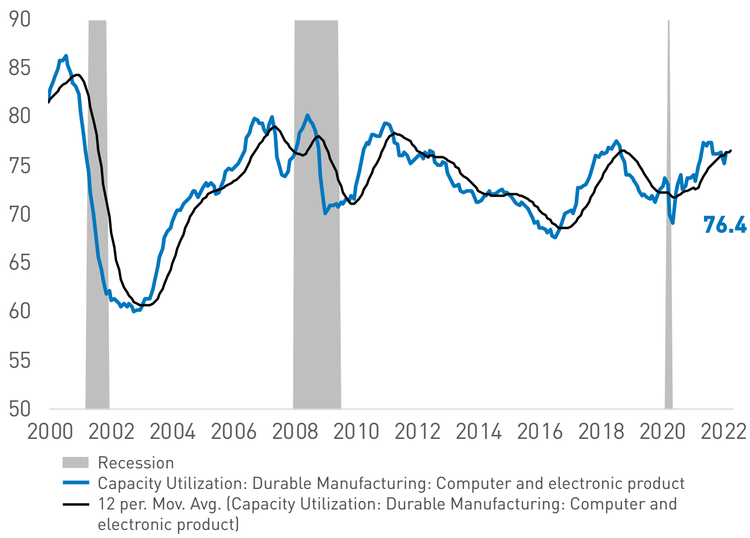
MANUFACTURING CAPACITY UTILIZATION

Overall capacity utilization increased during February, rising from 77.3% to 77.6%. Manufacturing capacity rose from 77.1% to 78%. Manufacturing capacity utilization is 3.2% above pre-pandemic levels. Computer and electronic production capacity utilization rose 1.4% to 76.4% and is 3.5% above pre-pandemic levels. Electrical equipment, appliances and components utilization rose 0.4% to 81.4%. Capacity utilization for the motor vehicles and parts sector fell 3.6% to 66.7%. This is 11.4% below pre-pandemic levels. Finally, utilization in the aerospace and miscellaneous transportation equipment sector rose 3.2% to 75.6%. This is 16.9% above pre-pandemic levels.

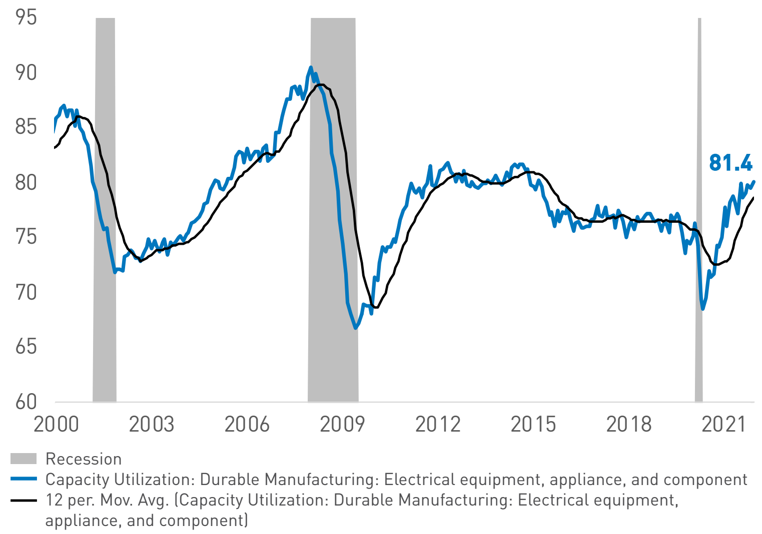
Manufacturing (NAICS)



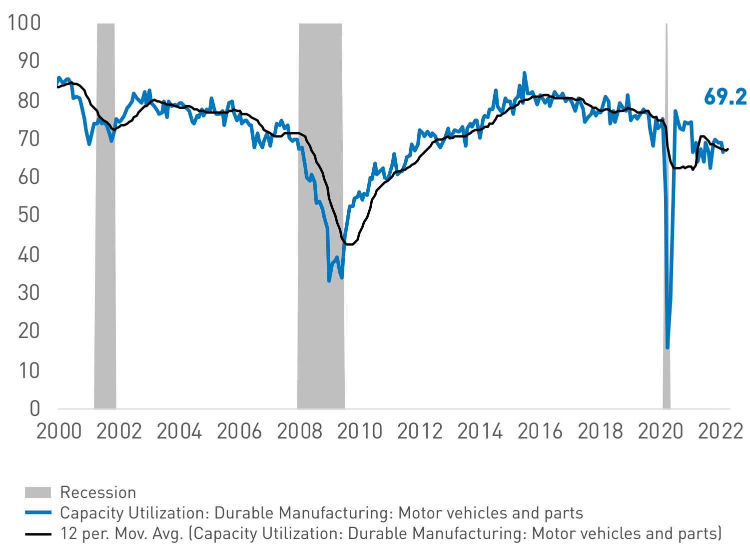
Computer & Electronic Product



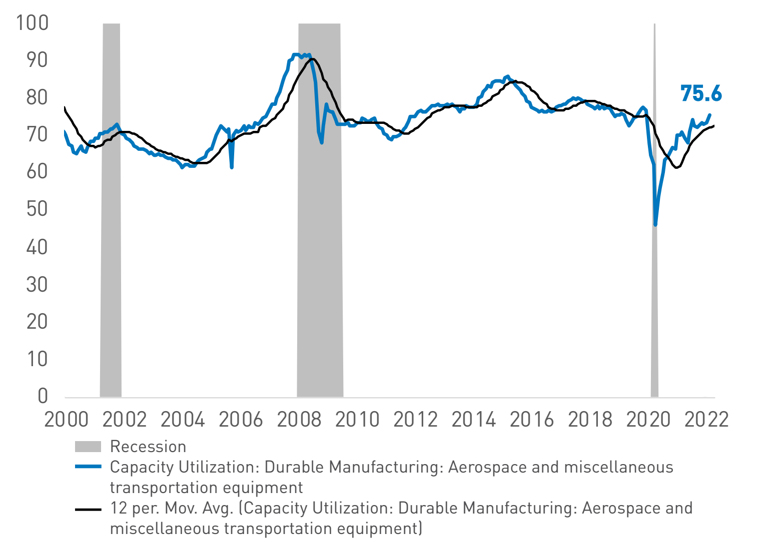
Electrical Equipment, Appliance, & Component



Motor Vehicles & Parts

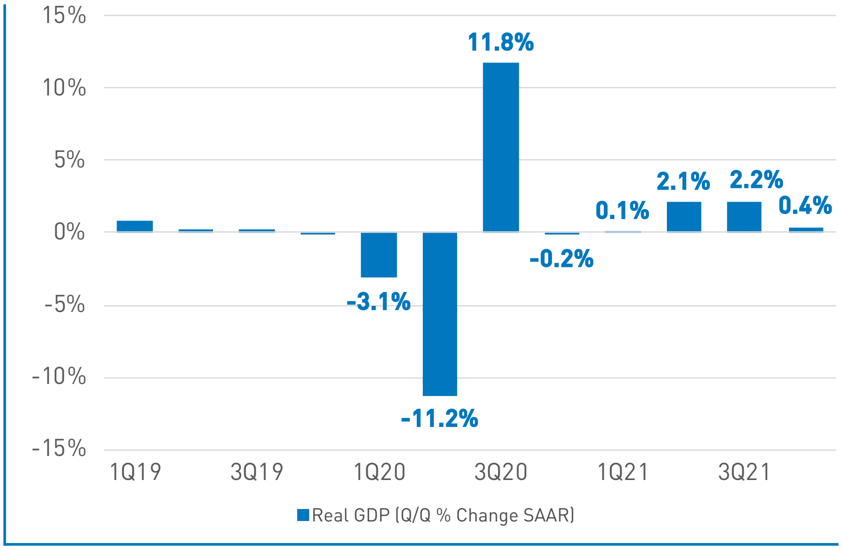


Aerospace & Miscellaneous Transportation Equipment



EUROPEAN OUTLOOK

ECONOMIC GROWTH



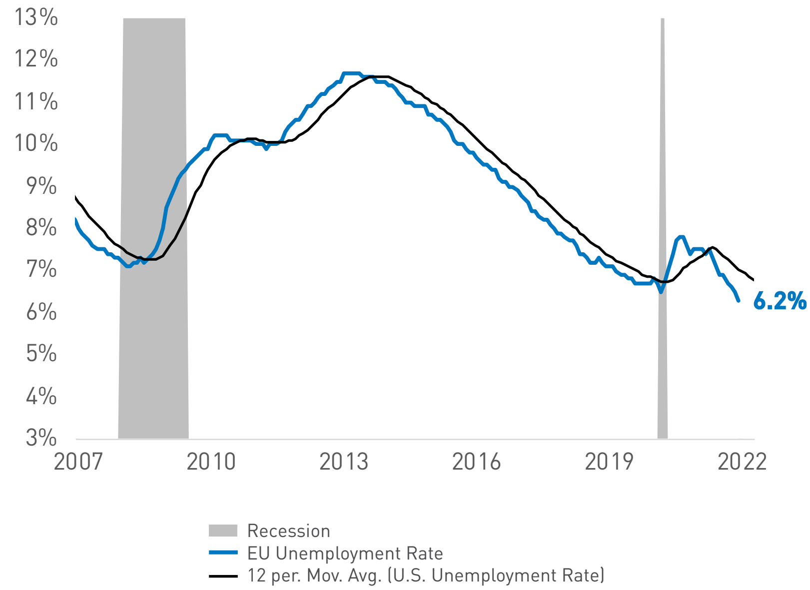
Economic growth in Europe will be much slower in 2022 than previously expected as a result of the Russian invasion of Ukraine. We have lowered our annual forecast by nearly a percentage point to 3.1%. International commerce will be impacted as supply chains reconfigure. Shortages will intensify in an already tight and difficult environment. Inflation will be higher as a result of higher energy and commodity prices. Confidence will be weaker and resources will be diverted to humanitarian aid. Growth for the year could be materially worse than we currently expect if the conflict intensifies, sanctions are broadened, or if we see steeper increases in energy and commodity prices, more severe drag from trade, or a further decline in sentiment. The underlying economic conditions were solid in advance of the war, which should help cushion the blow. The conflict has also weighed on European equity markets which will hurt consumer spending somewhat. The benchmark Eurostoxx 50 is down 11% year-to-date, versus the S&P 500 which is down 8%.

	Q/Q PERCENTAGE CHANGE				Y/Y PERCENTAGE CHANGE			
	2021Q1	2021Q2	2021Q3	2020Q4	2021Q1	2021Q2	2021Q3	2021Q4
EURO AREA	-0.2%	2.2%	2.3%	0.3%	-1.1%	14.4%	3.9%	4.6%
EU (27)	-0.0%	2.1%	2.2%	0.4%	-1.1%	13.8%	4.1%	4.8%
GERMANY	-1.7%	2.2%	1.7%	-0.7%	-2.8%	10.4%	2.9%	1.4%
FRANCE	0.1%	1.3%	3.1%	0.7%	1.5%	19.0%	3.5%	5.4%
ITALY	0.3%	2.7%	2.6%	0.6%	-0.3%	17.3%	4.0%	6.4%
SPAIN	-0.7%	1.2%	2.6%	2.0%	-4.3%	17.7%	3.4%	5.2%

	2022 ECONOMIC GROWTH (GDP % CHANGE)	2023 ECONOMIC GROWTH (GDP % CHANGE)
EURO AREA	3.1%	2.5%
GERMANY	2.7%	2.9%
FRANCE	3.4%	2.3%
NETHERLANDS	3.4%	2.1%

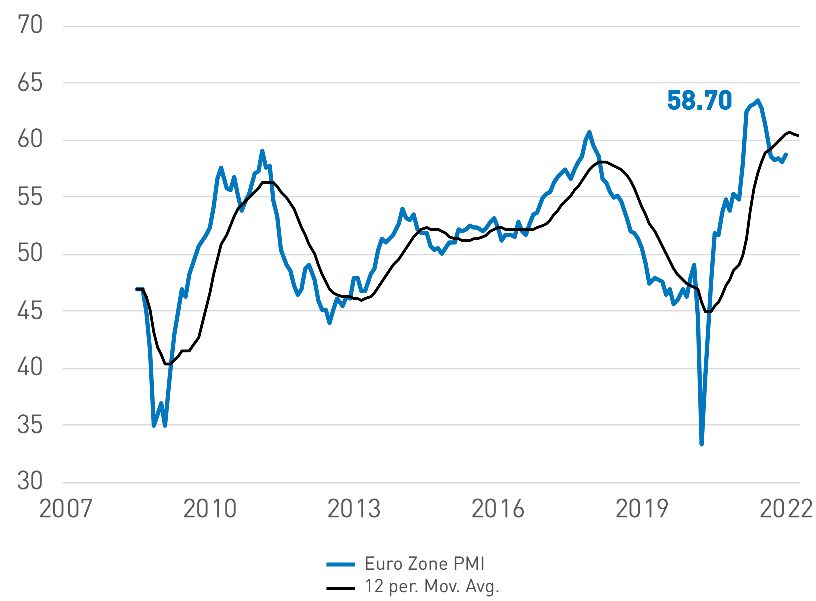
EMPLOYMENT

The unemployment rate in the euro area declined two-tenths of a percentage point in January, falling from 7% to 6.8%. It was 8.3% in January 2021. In the EU, the unemployment rate fell from 6.3% in December 2021 to 6.2% in January 2022. The lowest unemployment rates are in Czechia (2.2%), Poland (2.8%), Germany (3.1%), and Malta (3.1%). In the fourth quarter of 2021, the job vacancy rate was 2.8% in the euro area and 2.6% in the EU. These rates have increased from 2.6% and 2.4% in the prior quarter respectively.



MANUFACTURERS' SENTIMENT (PMI)

The European manufacturing sector was strong through the first two months of the year. Next month we will have a first look at how the Russia-Ukraine war is impacting the European manufacturing sector. In February the Eurozone Manufacturing PMI was 58.2, driven by gains in output and new orders. New orders rose at the highest rate in six months. Backlog rose at the fastest rate in four months. Supply constraints continue to be a key theme. High costs and prices continue to exert pressure. Input cost and output price inflation slowed somewhat during the month but were still among the fastest on record.



E.U. END MARKETS FOR ELECTRONICS

Manufacturing output rose 0.3% in January. Manufacturing output is up 0.3% over the last year and up 2.1% over the last two years.

COMPUTER, ELECTRONIC & OPTICAL PRODUCTS

The electronics industry, which includes categories such as components, loaded boards, computers, communications equipment and consumer electronics, saw output decrease 6.1% during the month. The sector is up 14.8% over the last two years.

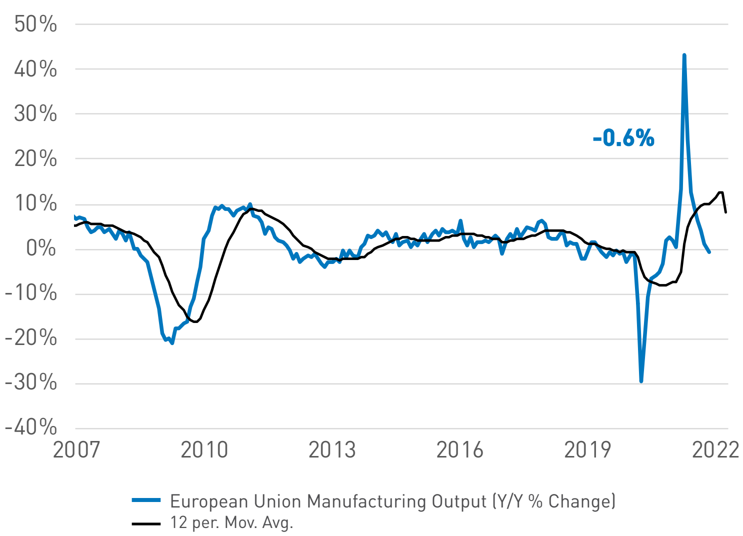
MOTOR VEHICLES

The motor vehicle manufacturing production index declined 9.9% in February. Auto production continues to be hampered by supply shortages. Auto production in the European Union remains off 14.2% from a year ago and 26.8% from two years ago.

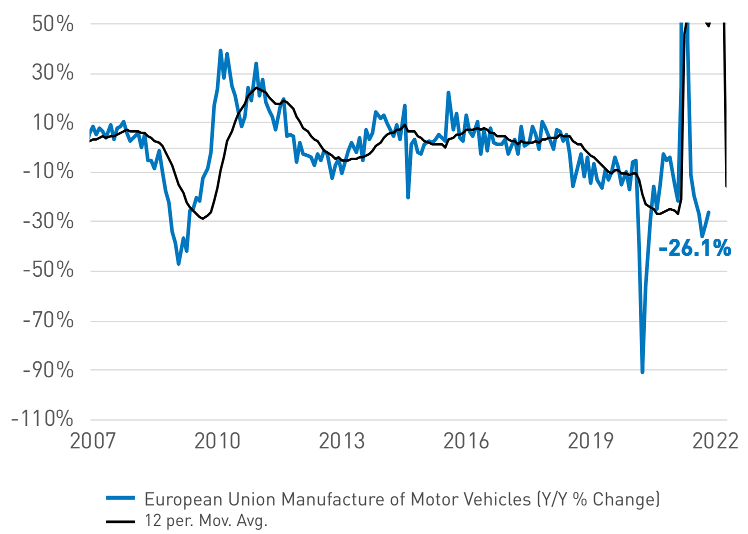
AIR & SPACECRAFT & RELATED MACHINERY

The air and spacecraft manufacturing sector fell 1.2% in January. The segment is off 2.1% over the last year and 23.3% over the last two years.

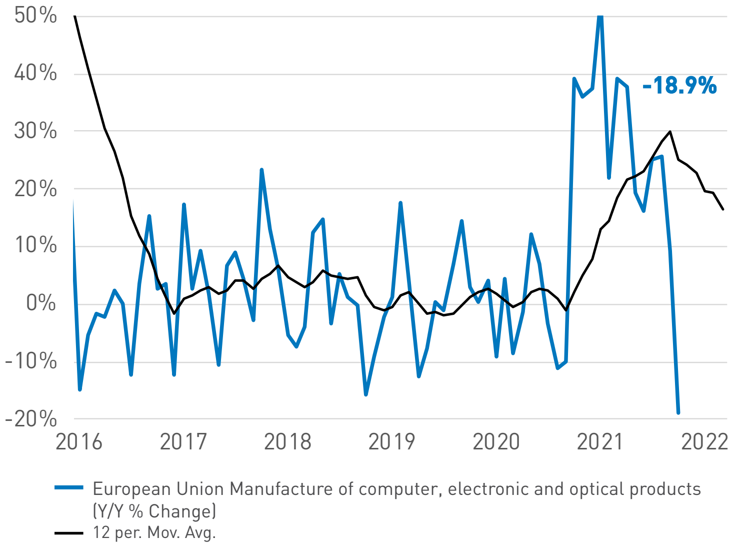
E.U. Manufacturing Output



E.U. Manufacture of Motor Vehicles



E.U. Manufacture of Computer, Electronic & Optical Products (Y/Y % Change)



E.U. Manufacture of Air & Spacecraft & Related Machinery (Y/Y % Change)