IPC BUILD ELECTRONICS BETTER

JULY 2021

ECONOMIC OUTLOOK

Five key themes are combining to define the current economic environment. These include supply chain constraints, manufacturing optimism, inflationary pressures, a tight labor market and the rising risk of a COVID resurgence.

Many industries continue to be plagued by supply chain disruptions, and the electronics industry is no exception. While pressure from these disruptions will improve in the coming months, we believe supply chain disruptions will continue to reverberate through the economy, and the electronics industry, well into next year. Supply chain disruptions are negatively impacting output across the globe. In China, second quarter GDP came in slightly below expectations, which was likely the result of slowing domestic demand and supply chain disruptions that curtailed export growth. In Europe and the United States, manufacturing output has declined in recent months. This is especially true in the auto sector, which has been hard hit by parts shortages. Incoming data suggests backlogs remain elevated, inventories remain short and lead times remain historically long.

PCB and EMS demand in North America has risen significantly in recent months. When traditional supply channels are constrained, businesses look for capacity anywhere and everywhere. This has driven North American bookings to historic levels. PCB orders in June 2021 were higher than any month since early 2006. EMS bookings in June rose 61.3 percent year-over-year. We've also noted in recent months that shipments have undershot the strong uptick in orders. Over the last month, shipments are improving. Book-to-bill ratios suggest demand continues to be strong, and supply chain disruptions continue to hamper shipments. But the situation does seem to be improving on the margin. North American EMS shipments in June were up 14.3 percent compared to the same month last year.

At the same time, manufacturers remain extremely optimistic. The ISM PMI did shrink somewhat over the last month, but manufacturers in the United States remain positive. In Europe, the manufacturing PMI set a new all-time high — the fourth consecutive month this has happened. Manufacturers are remaining optimistic despite supply chain disruptions and production interruptions. Manufacturers, at least for now, seem to also be dismissing the risk of rising COVID cases, which is a meaningful risk factor that we'll discuss shortly.

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Supply chain disruptions have pushed prices higher. We've noted historically higher transportation costs over the last year. Now that economies are reopening, demand is accelerating, and this is resulting in higher prices for both consumers and producers. Commodity prices have hit all-time highs. Other input prices are up significantly.

In the United States, consumer prices increased 0.9 percent in June, after increasing 0.8 percent in April and 0.6 percent in May. Consumer prices are up an annualized 9.7 percent over just the last three months. Over the last six months, prices are up an annualized 7.32 percent — the fastest rate since the early 1980s. Used car and truck prices were up 10.5 percent in June, accounting for about one-third of the aggregate price increase in June. New vehicles were up 2 percent in June, which is the largest monthly increase since 1981. Other areas that saw price increases include hotels (up 7.9 percent), car and truck rentals (up 5.2 percent) and airfare (up 2.7 percent). Some of these price increases are being driven by a mismatch of supply and demand as the economy reopens and consumers demand services they have avoided over the last 18 months. And it isn't just consumer prices. Producer prices rose 1 percent in June and are up 7.3 percent over the last year. While some of these price increases will moderate as supply and demand move into equilibrium, we're likely to see prices remain elevated in some areas for sometime. The M2 measure of money supply is up 32 percent since the start of the pandemic and will likely provide upward pressure on pricing well into 2022.

There are currently 9.2 million nonfarm job openings in the U.S. economy — a figure far above any level seen previously. Over 940,000 people quit their last job and are still looking for a new one. This is the highest level since 2016 and suggests employees are feeling confident about job prospects. Employers are having to offer bonuses and higher wages to attract workers. Average hourly earnings rose 0.5 percent last month, bringing them up 6.4 percent from pre-pandemic levels, while hours worked are down 3.6 percent. That summarizes the labor market in the United States today. Employers are having to compete against generous unemployment benefits. They are having to pay more but have been unable to fill open spots, so total hours worked, and as a result production, haven't been able to ramp as quickly as possible. Half the states in the United States have elected for early reduction or elimination of some of the extra unemployment benefits, and this should help propel hiring.

The biggest risk factor by far is the risk of a re-emegence of COVID. The coronavirus Delta variant is a highly contagious strain that was first identified in India and is now circulating widely in much of the world. In the United States, cases are rising and most alarming, hospitalizations are accelerating. Some regions are beginning to reinstitute restrictions. Israel recently reinstated mask requirements indoors and is requiring inbound travelers to quarantine upon arrival. Los Angeles County has also mandated masks in indoor public spaces.

Increasing COVID cases can stymie economic activity through two primary channels. First, rising cases, hospitalizations and deaths could cause consumers and businesses to forgo spending and investment and move available funds to precautionary savings. Secondly, reinstituted restrictions could temporarily curtail economic activity while those restrictions are in place. All eyes remain on the trajectory of COVID cases.

4.7%

Economic growth is picking up in Europe, and expectations for 2021 GDP growth have increased over the last month. Europe GDP is now expected to grow 4.7 percent.

-0.1%

Manufacturing output in the United States slipped 0.1 percent last month as supply chain disruptions continue to affect production. Manufacturing output in Europe declined in May, falling 0.8 percent.

7.9%

China grew 7.9 percent in the second quarter, slightly below expectations. Record commodity prices have driven inflation rates higher, and supply chain disruptions have likely held back growth somewhat.

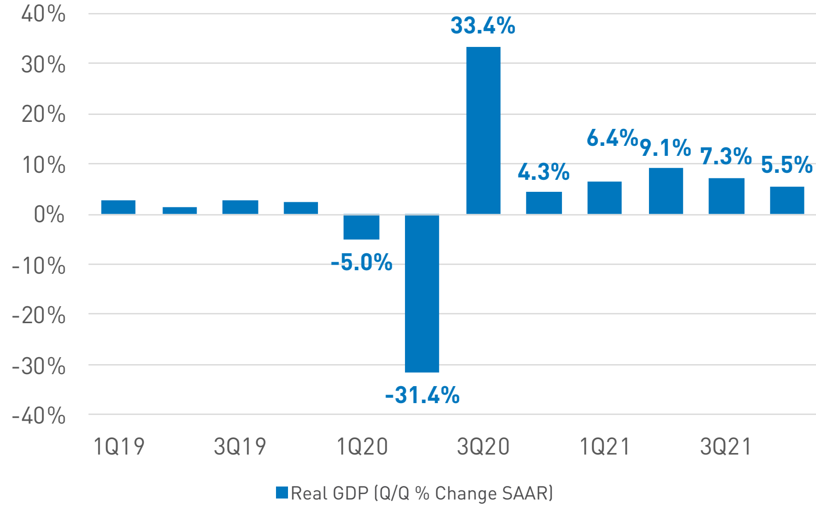
63.5%

Manufacturing sentiment continues to improve. In Europe, the manufacturing PMI increased to 63.5, the fourth consecutive month setting a new all-time high.

U.S. OUTLOOK

ECONOMIC GROWTH

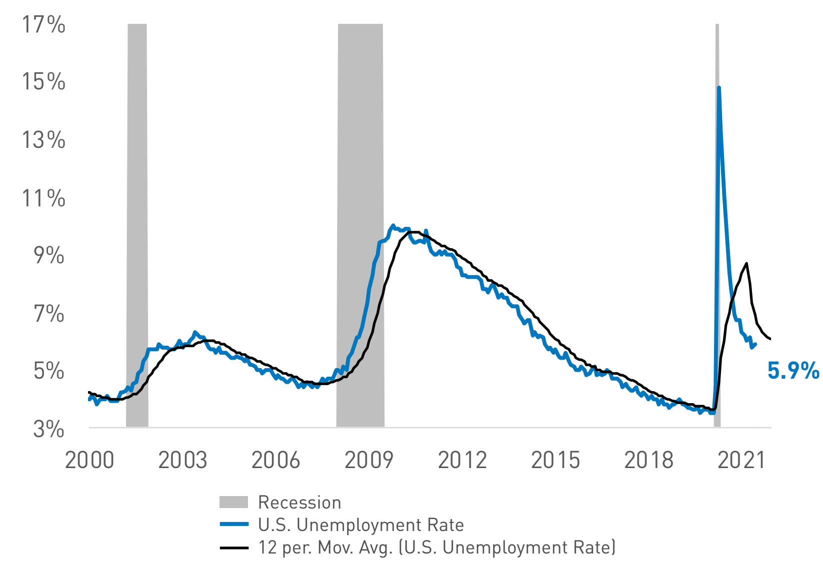
We received word this past month that the recession in the United States is officially over. In fact, it ended in April 2020, not long after it began. As long expected, the COVID recession — while one of the steepest recessions in history — was one of the shortest. The outlook for the economy has changed little over the last month. Our forecast for growth in 2021 declined by one-tenth, while our forecast for 2022 increased by the same amount. We continue to expect the middle two quarters of this year to be extremely strong, growing close to 9 percent and 7.3 percent, respectively.



	2021 ECONOMIC GROWTH (GDP % Change)	2022 ECONOMIC GROWTH (GDP % Change)	2021 EXCHANGE RATE (v. USD)	2022 EXCHANGE RATE (v. USD)
UNITED STATES	6.6%	4.5%	N/A	N/A
CANADA	6.2%	4.0%	1.23	1.23
MEXICO	5.6%	3.0%	20.25	20.70
EURO AREA	4.7%	4.2%	1.20	1.22
CHINA	8.5%	5.6%	6.44	6.48

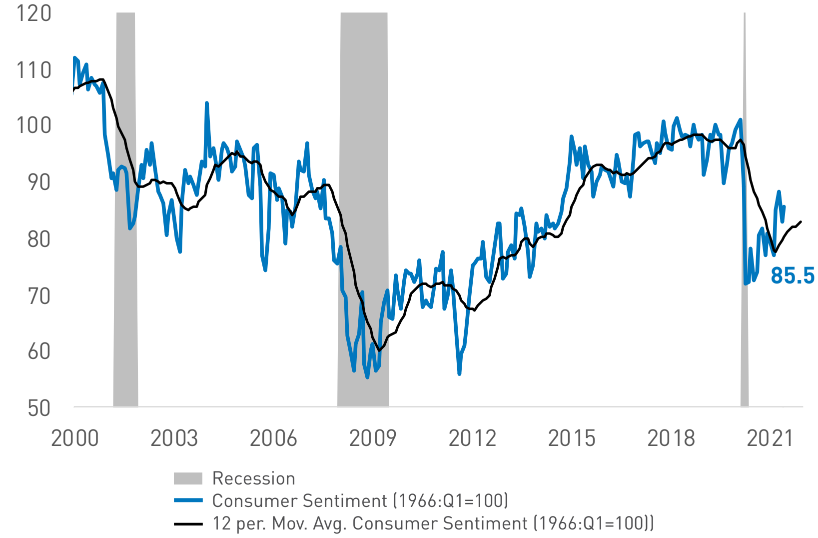
EMPLOYMENT

The economy added 850,000 jobs in June. The underlying trend is not as positive as the headline suggests. The civilian employment — an alternative measure that includes small business employment — declined by 18,000 jobs in June. This, in turn, pushed the unemployment rate up to 5.9 percent. During the month, we did see big gains in leisure and hospitality employment, a sector hard hit by the pandemic. Leisure and hospitality added 343,000 jobs, which is a sign that the service side of the economy is continuing to recover. Manufacturing added 15,000 jobs during the month. The labor market remains surprisingly tight given where we are in the economic cycle. Total hours worked rose 0.2 percent, while total pay for workers rose 0.5 percent. Compared to February 2020, average hourly earnings are up 6.6 percent, while total hours worked are down 3.7 percent — a sign employers are having to pay more to attract workers.



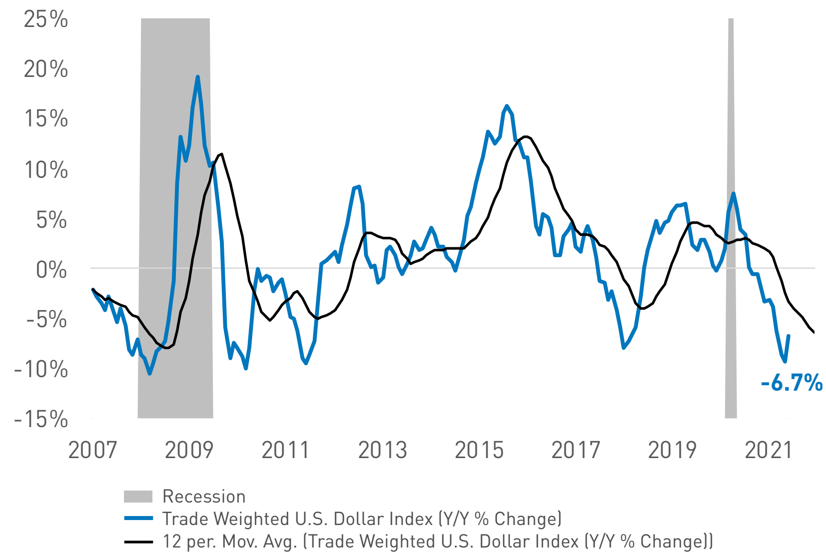
SENTIMENT

Consumer sentiment in the United States continues to ebb and flow as it slowly grinds higher. After declining in May, sentiment improved in June. The Consumer Sentiment Index rose from May's 82.9 reading to 85.5 in June. This is the second-highest level since the start of the pandemic. The rise was driven by improving sentiment among households with incomes above $100,000 and primarily from improving expectations for future economic activity. But incoming data for the first few weeks of July suggest that the move higher was somewhat premature. Sentiment stepped back down in early July as expectations cooled for both current conditions and future economic outlook. Consumers are expressing concern for higher prices, as complaints about rising prices on homes, vehicles and household durables reached an all-time record in early July.



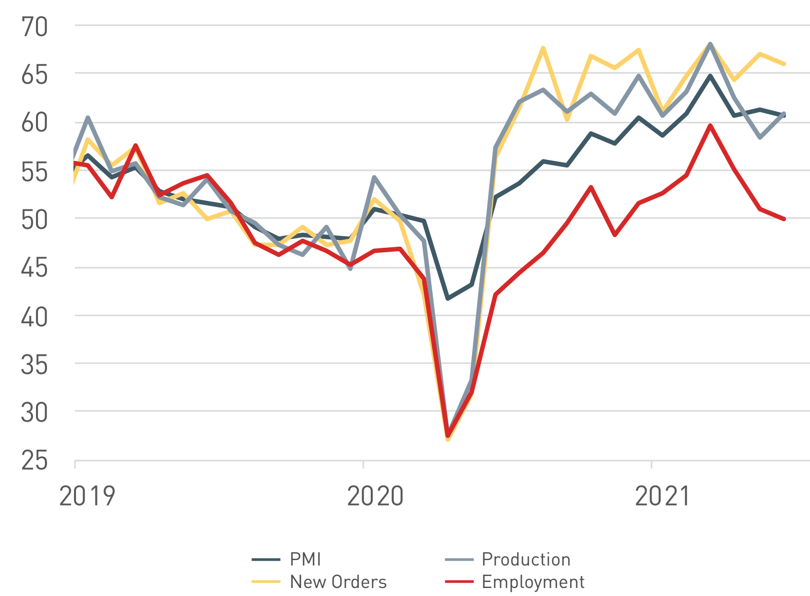
TRADE-WEIGHTED U.S. DOLLAR INDEX

The dollar moved higher over the last month, gainining 0.3 percent. And now all eyes are on the Fed, which meets at the end of the month, for a read on future monetary policy. The Fed has indicated it might tighten sooner than previously expected, and the market has begun pricing in expectations for tapering. Expectations for an earlier move could lift some pressure off the dollar. The trade-weighted dollar index is off 6.7 percent over the last year and 3.1 percent over the last two years. Recall that although the March meeting suggested no rate increase until 2023, the June meeting moved those expectations forward, and Fed members now expect 50 basis points of tightening in 2023.



MANUFACTURERS' SENTIMENT (PMI)

Overall, manufacturer sentiment changed little over the last month. The manufacturing sector continues to expand and manufacturers remain optimistic. But the supply chain remains constrained and that is holding back some potential growth. Record-long raw-material lead times and spot shortages are hindering manufacturers' ability to meet still elevated demand. Moreover, rising prices are crimping profitability. ISM's Prices Index increased 4.1 percentage points to 92.1, the highest reading since July 1979. The employment index fell 1 percentage point to 49.9 — a small decrease but an indication that manufacturers are struggling to attract, hire and retain qualified workers.



U.S. END MARKETS FOR ELECTRONICS

Industrial production increased in June, rising 0.4 percent, though prior months were revised downward. Manufacturing production declined 0.1 percent during the month (-0.3 percent including revisions to prior months). Ongoing supply chain issues continue to hamper production. Manufacturing production decline was driven by a 6.6 percent decline in auto production. Manufacturing outside of autos increased 0.4 percent during the month and is now above pre-pandemic levels.

AUTOMOTIVE PRODUCTS

Auto production fell 5.4 percent in June, as shortages continue to hamper production levels. Output is 10.1 percent below pre-pandemic levels, but 9.4 percent higher than a year ago.

TRANSIT EQUIPMENT

Transit equipment production fell 2.3 percent over the last month. The sector is down 5 percent from the pandemic and down 27.2 percent from two years ago.

INFORMATION PROCESSING & RELATED EQUIPMENT

Production in the information processing and related equipment sector increased 0.4 percent over the month. The sector is up 6.3 percent over the last year, 12.4 percent from two years ago and 4.9 percent from February 2020.

INDUSTRIAL & OTHER EQUIPMENT

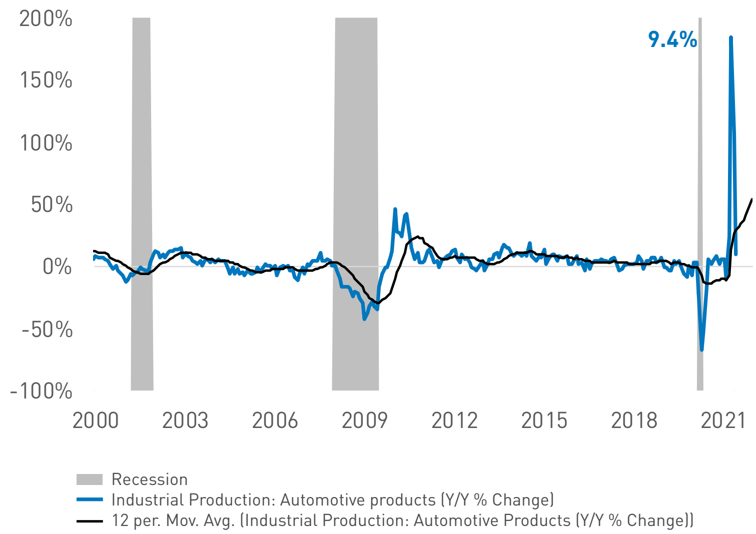
The industrial segment shrunk 0.3 percent over the last three months. The sector is up 14.4 percent over the last year and down just 1 percent from the start of the pandemic.

DEFENSE & SPACE EQUIPMENT

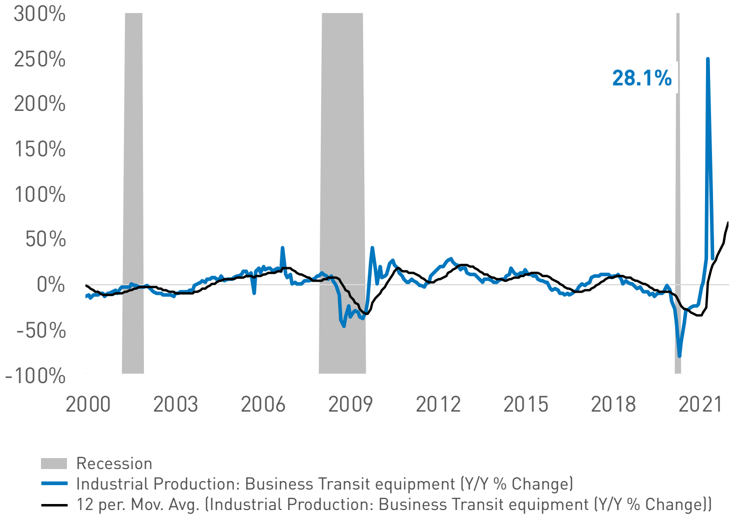
The defense and space equipment segment rose a solid 4.4 percent over the last month. The sector is up 16.5 percent over the last year and 9.5 percent since the start of the pandemic.

Manufacturing

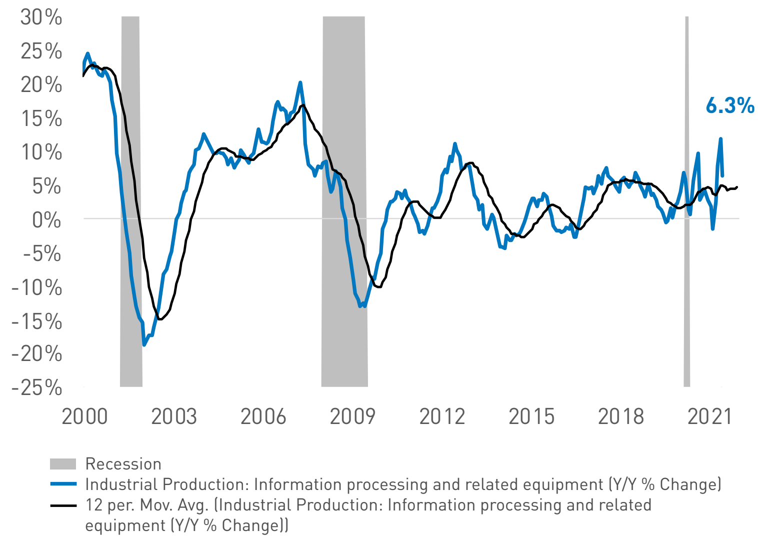
Automotive Products



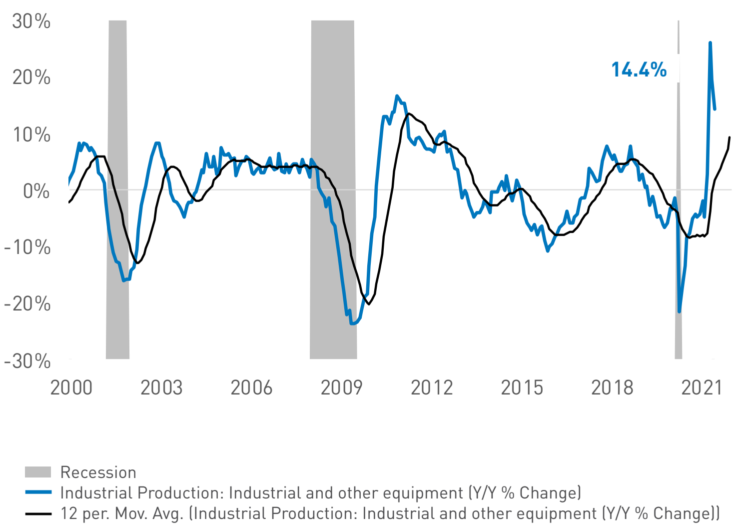
Business Transit Equipment (Y/Y % Change)



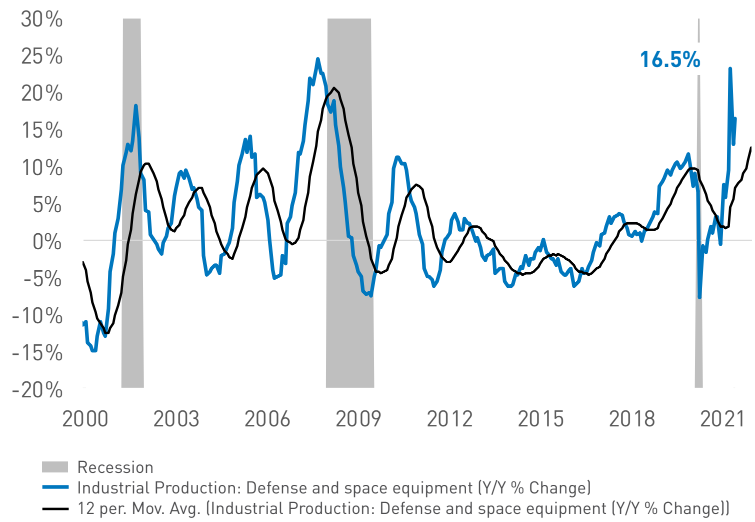
Information Processing & Related Equipment (Y/Y % Change)



Industrial & Other Equipment (Y/Y % Change)



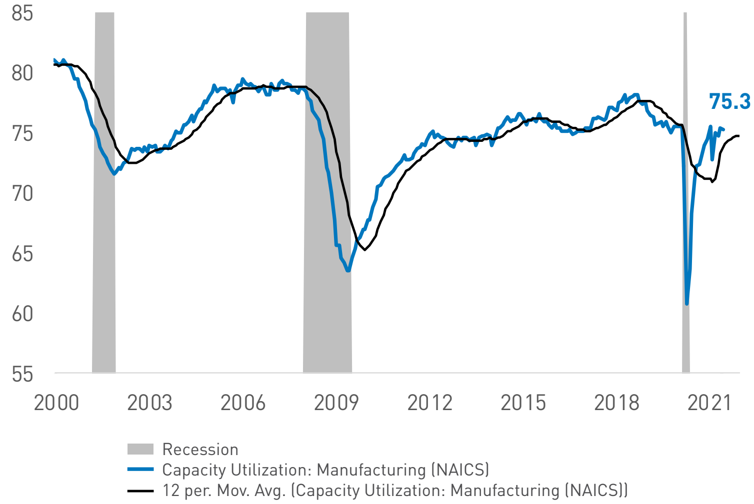
Defense & Space Equipment (Y/Y % Change)



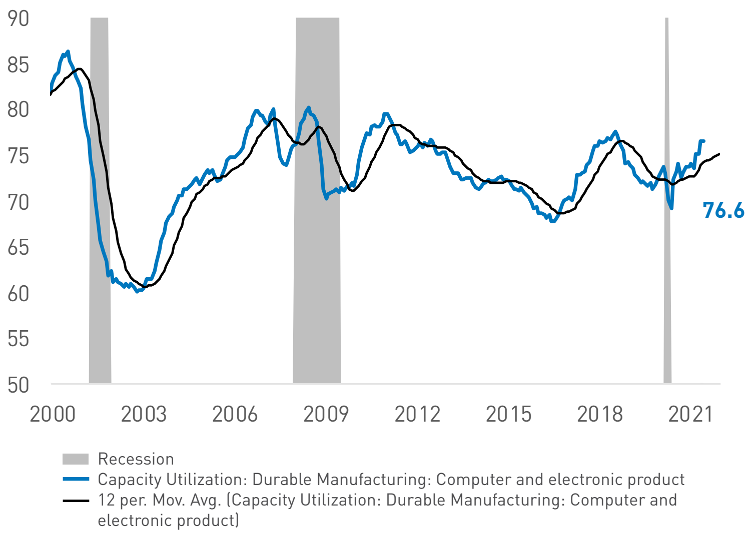
MANUFACTURING CAPACITY UTILIZATION

The industrial and manufacturing sectors continue to recover, but shortages and other supply chain disruptions are hindering production levels. Overall capacity utilization moved higher in June, increasing to 75.4 percent. But manufacturing capacity utilization slipped slightly, falling from 75.4 percent to 75.3 percent. Computer and electronic production capacity utilization moved to 76.3, and utilization for the motor vehicles and parts sector bounded back to 69.4 percent. Capacity utilization in electrical equipment, appliances and components slipped to 78.8, and utilization in the aerospace and miscellaneous transportation equipment sector dipped to 68.1.

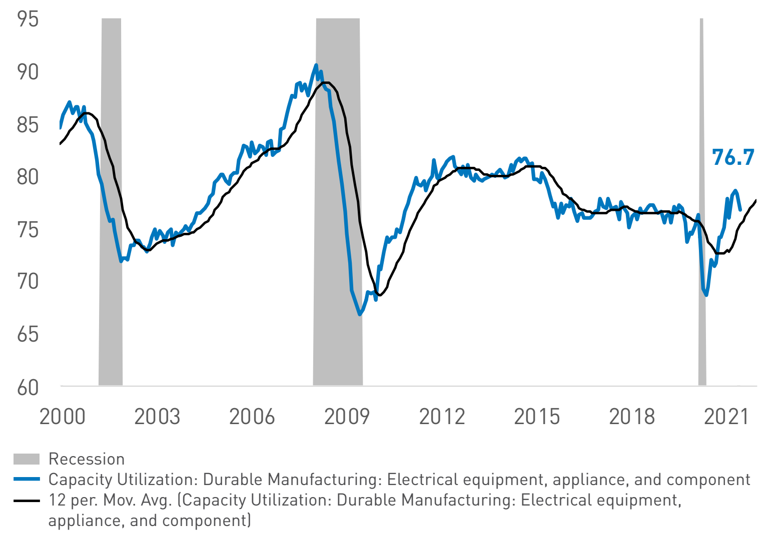
Manufacturing (NAICS)



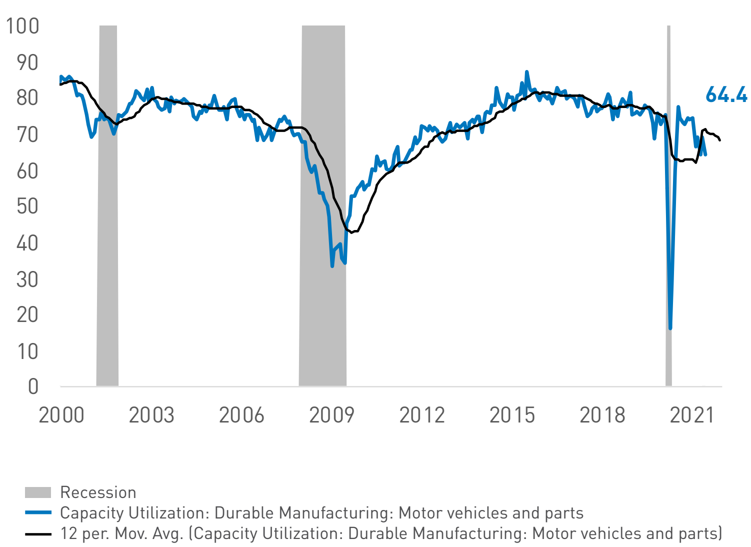
Computer & Electronic Product



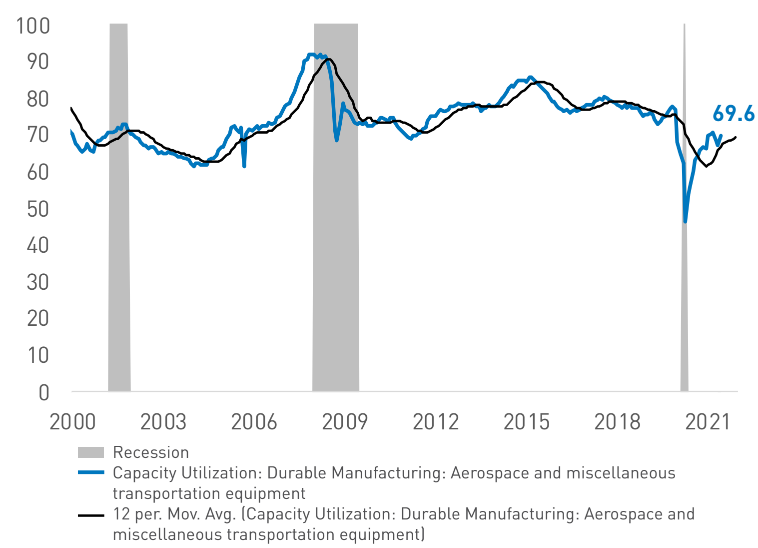
Electrical Equipment, Appliance, & Component



Motor Vehicles & Parts



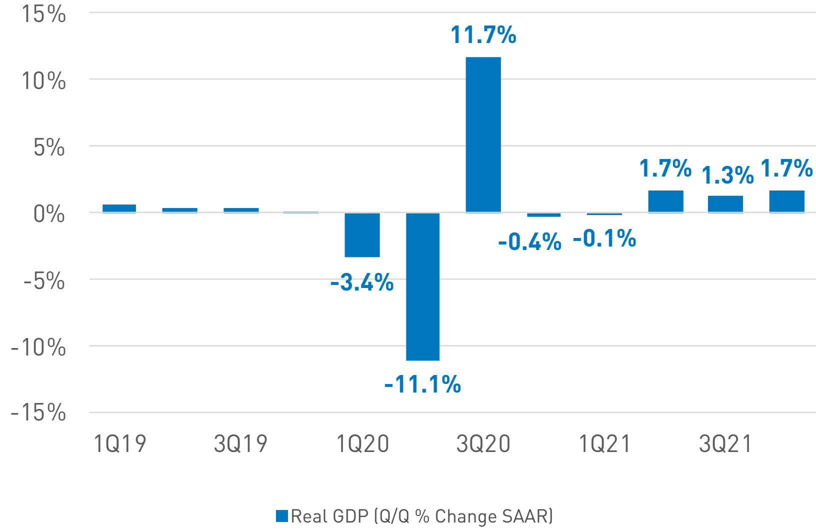
Aerospace & Miscellaneous Transportation Equipment



EUROPEAN OUTLOOK

ECONOMIC GROWTH

Our expectations for growth in Europe have increased over the last month. We now expect GDP to expand by 4.7 percent in 2021, up from 4.2 percent last month. With this upward revision to our forecast, we now expect the euro area to return to pre-pandemic levels by the fourth quarter of 2021. Prior to this revision, we anticipated it would take until 2022 for Europe to return to pre-crisis levels. Growth in Europe is being fueled by improving demand both domestically and internationally. We are also seeing a quicker reopening of the service sector and stronger intra-EU tourism activity. The latter should benefit from the recent EU Digital COVID Certification. However, similar to the United States, rising cases from the Delta variant could stymie growth. We are starting to see improving sentiment and a pickup in hiring in a number of hard-hit countries, like Spain, which is highly dependent on tourism.

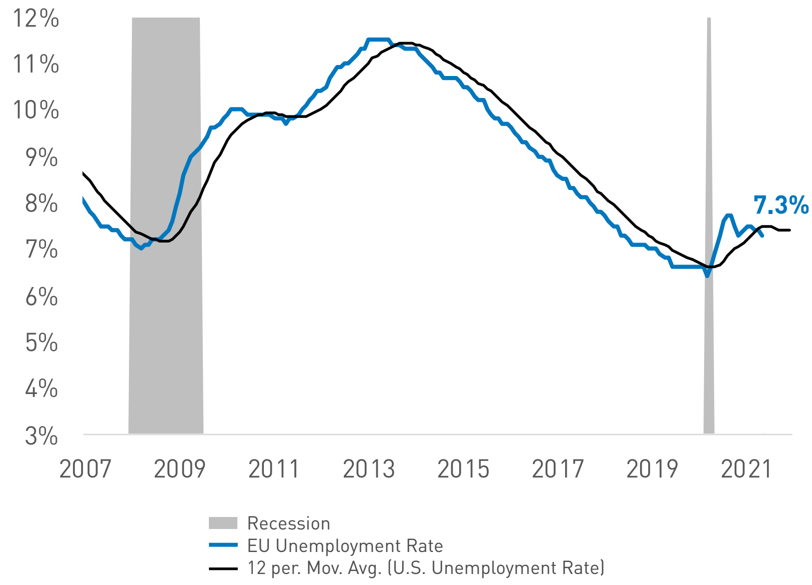


	Q/Q PERCENTAGE CHANGE				Y/Y PERCENTAGE CHANGE			
	2020Q2	2020Q3	2020Q4	2021Q1	2020Q2	2020Q3	2020Q4	2021Q1
EURO AREA	-11.5%	12.6%	-0.6%	-0.3%	-14.6%	-4.1%	-4.7%	-1.3%
EU (27)	-11.1%	11.7%	-0.4%	-0.1%	-13.8%	-4.0%	-4.4%	-1.2%
GERMANY	-9.7%	8.7%	0.5%	-1.8%	-11.2%	-3.8%	-3.3%	-3.1%
FRANCE	-13.2%	18.5%	-1.5%	-0.1%	-18.4%	-3.5%	-4.6%	-1.2%
ITALY	-12.9%	15.9%	-1.8%	0.1%	-18.1%	-5.2%	-6.5%	-0.8%
SPAIN	-17.8%	17.1%	0.0%	-0.5%	-21.6%	-8.6%	-8.9%	-4.3%

	2021 ECONOMIC GROWTH (GDP % CHANGE)	2022 ECONOMIC GROWTH (GDP % CHANGE)
EURO AREA	4.7%	4.2%
GERMANY	3.4%	4.3%
FRANCE	5.7%	4.2%
NETHERLANDS	2.9%	3.2%

EMPLOYMENT

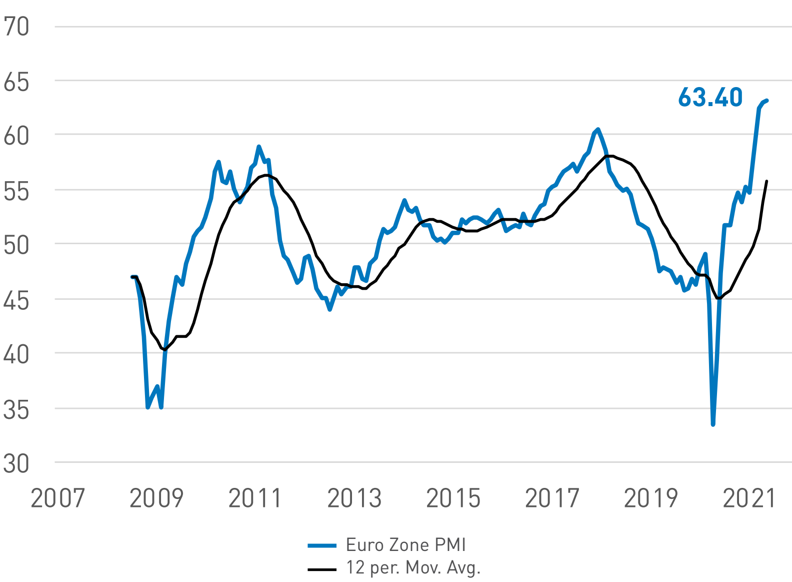
The employment picture continues to improve in Europe. The euro area seasonally adjusted unemployment rate dropped from 8.1 percent in April to 7.9 percent in May. This is up from 7.5 percent in May 2020. The EU unemployment rate was 7.3 percent in May 2021. Unemployment decreased by 382,000 in Europe and 306,000 in the euro area. The Netherlands and Czechia have the lowest unemployment rates at 3.3 percent, while Spain and Greece have the highest rates of unemployment at 15.4 percent and 15.23 percent, respectively. We continue to expect the unemployment rate to fall in the coming months, but it will likely take into 2022 to recover to pre-pandemic levels even with our expectations for higher economic growth.



MANUFACTURERS' SENTIMENT (PMI)

The eurozone manufacturing sector hit another new all-time high in June. This is the fourth consecutive month that the eurozone manufacturing sector has hit a new high. The headline PMI for the month was 63.5, up from 63.1 in May. All three market groups reported stronger improvements over the last month. Investment goods saw the strongest growth over the last month, while intermediate goods recorded the best PMI reading in history. Consumer goods lag these other two groups but did record its strongest growth rate since June 2000.

The Netherlands continues to lead in terms of highest PMI, though it did slip slightly over the last month. Austria recorded the second-best performance and the highest PMI of its history. Similar to elsewhere in the world, European manufacturers struggle to meet strong demand as evidenced by high order backlog. European manufacturers have also been unable to avoid the fallout of constrained supply chains. Average lead times have deteriorated to the second-greatest degree in history, surpassed only by last month. European manufacturers are also seeing increasing input prices.



E.U. END MARKETS FOR ELECTRONICS

Manufacturing output declined in May, falling 0.8 percent. While manufacturers remain optimistic and demand remains strong, supply chain constraints have hindered production. Output is up 22.9 percent over the last year but down 2.4 percent over the last two years. Manufacturing output is down 0.3 percent since the start of the pandemic.

COMPUTER, ELECTRONIC & OPTICAL PRODUCTS

The electronics industry, which includes categories such as components, loaded boards, computers, communications equipment and consumer electronics, fell 0.5 percent last month. The sector is up 32.2 percent over the last year.

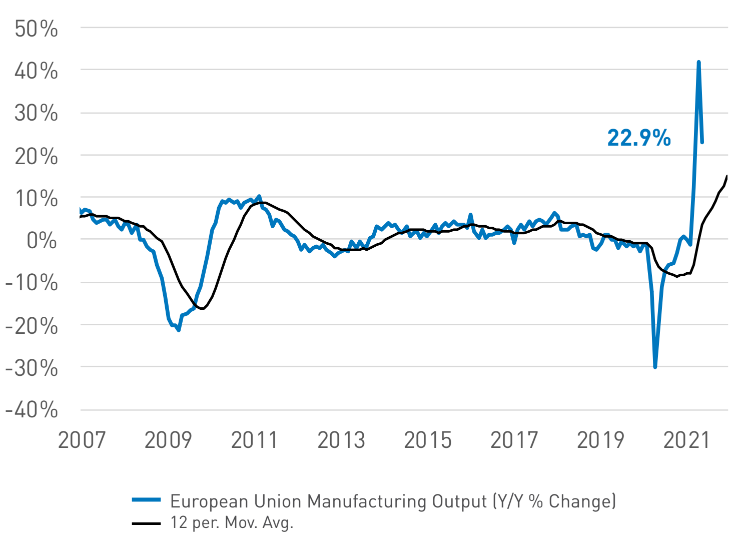
MOTOR VEHICLES

The motor vehicle manufacturing production index decreased another 9.7 percent in May. Auto production continues to be hampered by supply shortages. Auto production in the European Union remains off 36.2 percent from two years ago.

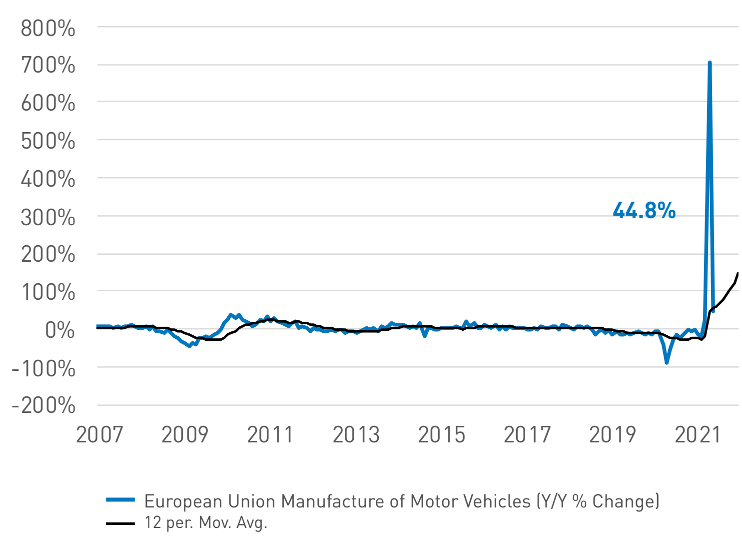
AIR & SPACECRAFT & RELATED MACHINERY

The air and spacecraft manufacturing sector declined in May, falling 6 percent. The segment is up 4.5 percent over the last year but down 29.8 percent percent over the last two years and a similar amount since the start of the pandemic.

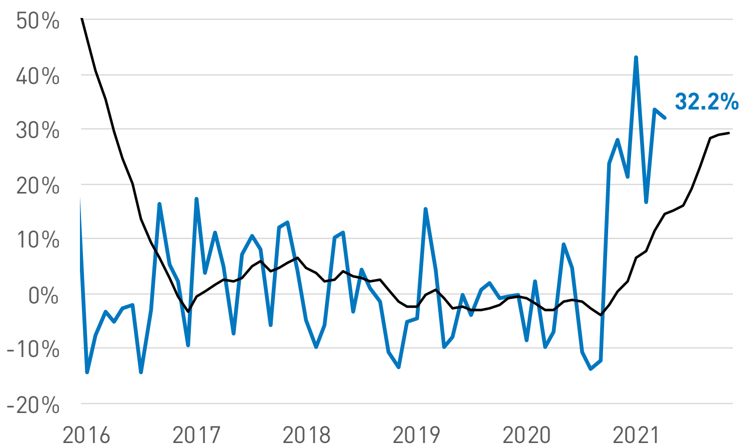
E.U. Manufacturing Output



E.U. Manufacture of Motor Vehicles

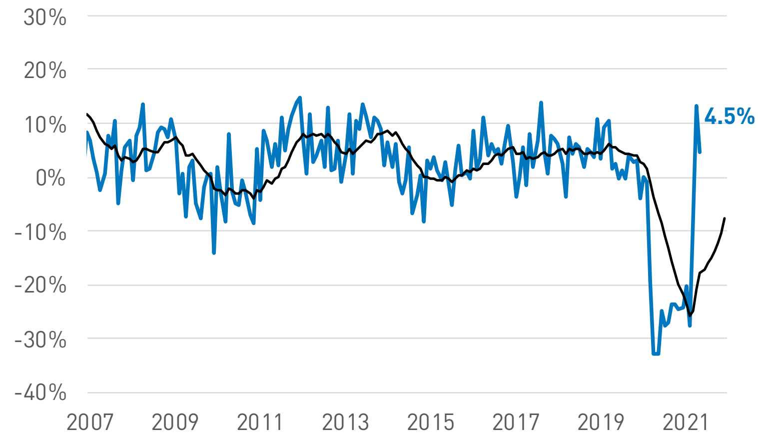


E.U. Manufacture of Computer, Electronic & Optical Products (Y/Y % Change)



European Union Manufacture of computer, electronic and optical products (Y/Y % Change)
12 per. Mov. Avg.

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



European Union Manufacture of air and spacecraft and related machinery (Y/Y % Change)
12 per. Mov. Avg.