

Economic Outlook

Robert C. Fry, Jr., Ph.D.

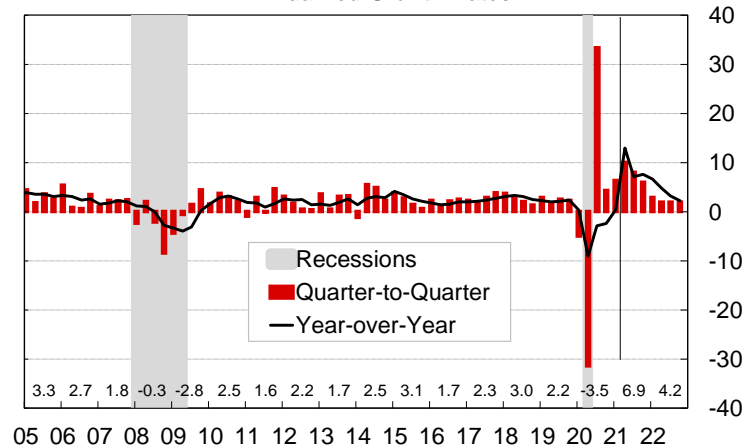
May 7, 2021

- The global economy continues to recover from the deepest, but shortest, recession since the Great Depression. China, which used extreme restrictions on travel to rapidly squash/control the virus that causes COVID-19, has fully recovered from the recession. The United States, which has relied on extreme fiscal and monetary stimulus, the rapid rollout of effective vaccines, and shifting resources from activities that can't be done safely to those that can, could fully recover from its decline in real Gross Domestic Product as early as this quarter. In most of the rest of the world, a resurgence in COVID-19 cases to new record highs is slowing or delaying the recovery.
- Real GDP in the United States rose at a 6.4% annual rate in the first quarter. It was the third straight quarter of growth after a steep decline in the first two quarters of 2020. Despite the strong rebound, GDP was still 0.9% below its pre-recession peak. I expect even faster growth in the second quarter. For the year, I expect GDP to rise 6.9%, the biggest annual increase since 1984. However, that follows a 3.5% decline in 2020, the worst annual decline since the demobilization from World War II in 1946. Industrial production in U.S. manufacturing, which fell 20.1% from February to April 2020, had recouped 95.2% of its losses by January 2020, but fell in February. It partially recovered in March but is being held down by a global shortage of semiconductors.
- China has more than fully recovered from a sharp contraction in the first two months of 2020. Chinese real GDP, which was down 6.8% year-over-year in the first quarter of 2020, was up 18.3% year-over-year in the first quarter of 2021. Value Added of Industry, China's official measure of industrial production, was up 14.1% year-over-year in March from a prior-year level that was depressed by the pandemic. It was up 12.8% (6.2% annual rate) from March 2019
- Real GDP in the European Union, which no longer includes the United Kingdom, declined 0.4% (-1.5% annual rate) in the first quarter. It was the second decline in a row and fourth in the last five quarters. It left GDP 5.0% below its pre-recession high. Industrial production in EU manufacturing fell 29% from February 2020 to April 2020. By January 2021, it had recouped almost 99% of that decline, but it fell slightly in February, leaving it down 1.2% year-over-year. Forecasts for 2020 growth in continental Europe have been revised down because of the slow rollout of vaccines there.
- Industrial production in Japanese manufacturing had been in decline even before the COVID-19 pandemic. Production in March was just 1.4% below its January 2020 level, but it was 7.7% below its December 2017 level and 18.3% below the record high set in 2007.
- Global real Gross Domestic Product (based on market exchange rates, not purchasing power parity) is expected to rise by 5.6% in 2021 and 4.2% in 2022, after declining 3.8% in 2020. The 2020 decline was the largest since the Great Depression but was smaller than expected/feared a year ago. Global industrial production is expected to grow 6.3% in 2021 after shrinking 4.4% in 2020. The 2020 decline in GDP was larger than the decline during the 2008-2009 Great Recession, but the decline in industrial production was smaller. This reflects the fact that the 2020 recession mostly affected the production and consumption of services, whereas previous recessions disproportionately affected the production and consumption of goods.
- Demand will be extraordinarily strong this year, but supply is unlikely to keep up. As a result, measured inflation in the United States will rise above the Federal Reserve's 2% target this month. The Fed believes this increase will be "transitory" and that inflation will recede later this year. If the Fed is wrong and inflation stays well above 2% for an extended period, the Fed will have to tighten monetary policy either sooner or more than it expects to. The longer the Fed waits to tighten, the more likely a recession will be needed to get inflation back down to 2%.

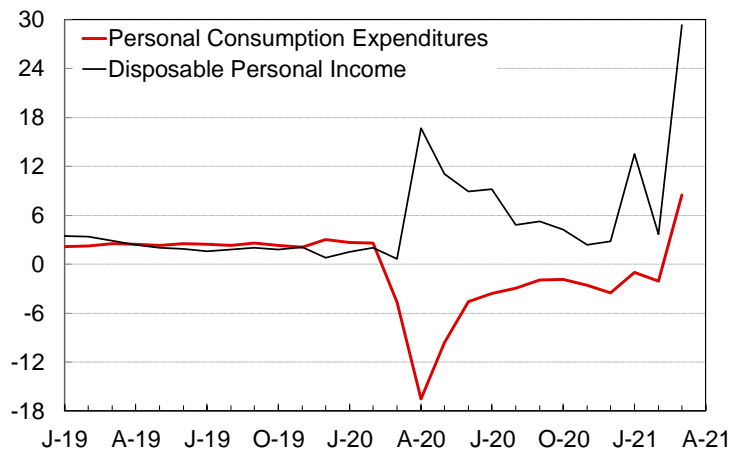
US Macroeconomic Overview

- Real Gross Domestic Product in the United States rose at a 6.4% annual rate in the first quarter. Despite three quarters of strong growth, GDP was still 0.9% below its pre-recession peak.
- Growth slowed in the fourth quarter of 2020 as the COVID-19 case count rose, then accelerated in the first quarter as vaccines were rolled out and the case count fell.
- I expect even faster growth in the second quarter and the best annual growth rate since 1984. Growth is likely to slow sharply in 2022.
- Real disposable personal income surged 23% in March as “recovery rebates” hit the bank accounts of most Americans. Because of a series of large relief/stimulus bills, disposable income has been higher throughout the recession and recovery than it was before the recession.
- Real personal consumption expenditures rose 3.6% in March, taking them above their pre-recession peak for the first time. Because income has grown much faster than spending, personal saving has increased. This will allow consumer spending to remain strong into 2022.
- Motor vehicle production has been constrained by a global shortage of semiconductors. Production will recover slowly until semiconductor producers catch up with demand.
- Consumers have realized that if they don't buy what is available now, they might not be able to buy a vehicle for several months. As a result, light vehicle sales have surged.
- Light vehicle sales rose to an 18.5 million seasonally adjusted annual rate in April, the highest selling rate since 2005. With fewer vehicles available for sale, sales are likely to fall until production returns to normal.

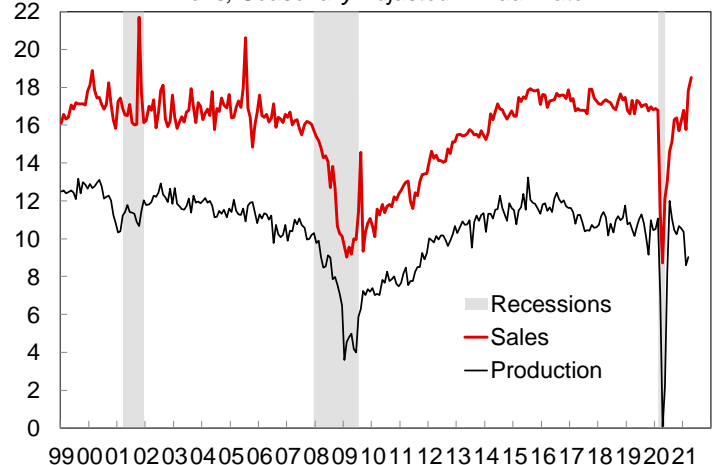
US Real Gross Domestic Product
Annualized Growth Rates



US Real Consumer Spending & Disposable Income
Percent Change from Year Ago, Chained 2012 Dollars



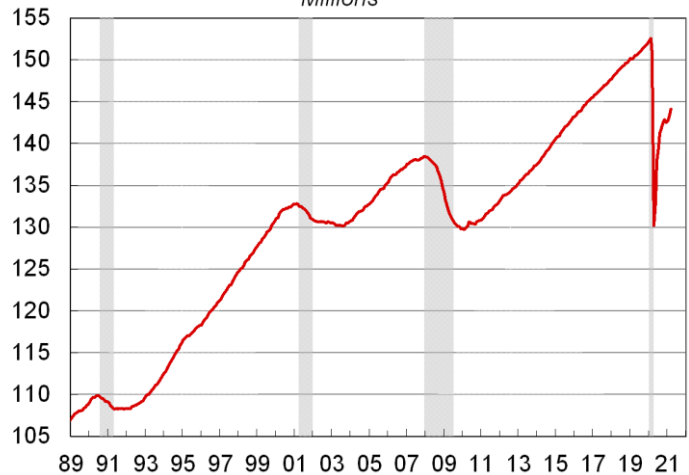
US Light Vehicle Sales & Production
Millions, Seasonally Adjusted Annual Rate



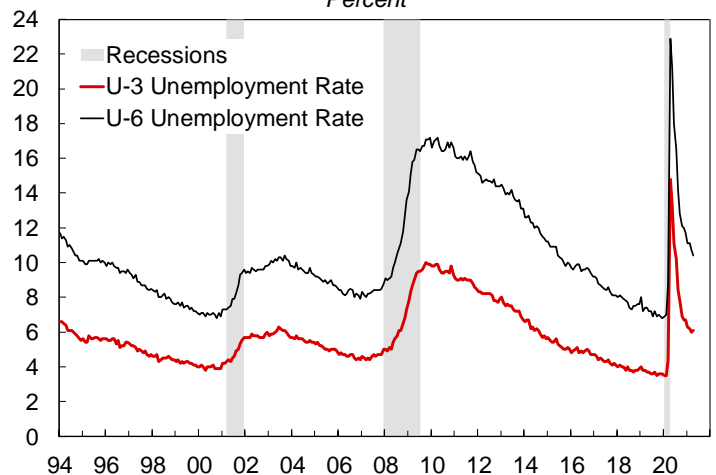
US Labor Market

- Nonfarm payrolls rose by just 266,000 in April, far short of consensus expectations of a 1 million increase, and March job growth was revised down. Payroll employment remains 8.2 million below the peak reached in February 2020.
- Unemployment insurance benefits that exceed wages, closed schools, and lingering fear of COVID-19 are keeping many unemployed people from accepting job offers. Collecting UI benefits after receiving a job offer is generally against the law, but it's not clear that the law is being enforced.
- The civilian unemployment rate, which had declined from 14.7% in April 2020 to 6.0% in March 2021, ticked up to 6.1% in April. It remains well above its February 2020 level of 3.5%, a 51-year low.
- Because people who haven't looked for a job in the last four weeks don't count as unemployed, many economists believe the headline unemployment rate significantly understates the extent of unemployment in the U.S. labor market. However, this factor may be offset by people who are nominally looking for work but without any serious intent of accepting a job offer.
- Despite the still-elevated unemployment rate, 42% of members of the National Federation of Independent Business reported that they had jobs they couldn't fill in March.
- The Job Openings and Labor Turnover Survey (JOLTS) reported nearly 7.4 million job openings at the end of February, only slightly below the record of 7.6 million reached in November 2018.
- The Employment Cost Index, the best measure of U.S. labor costs, rose in the first quarter at the fastest rate since 2006.

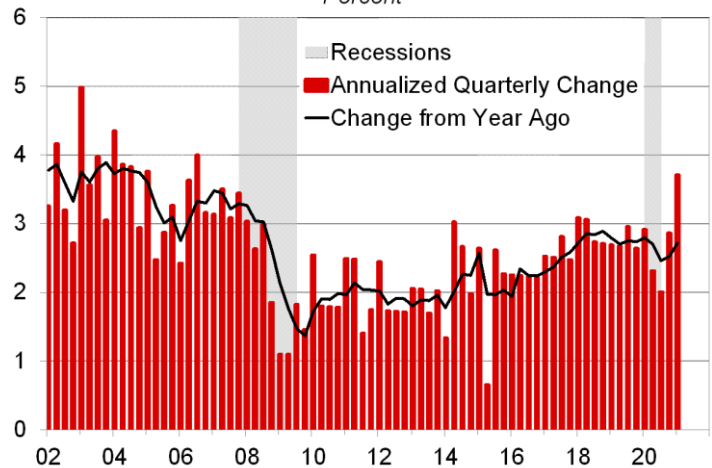
US Nonfarm Payroll Employment
Millions



US Civilian Unemployment Rate
Percent



US Employment Cost Index: Total compensation
Percent

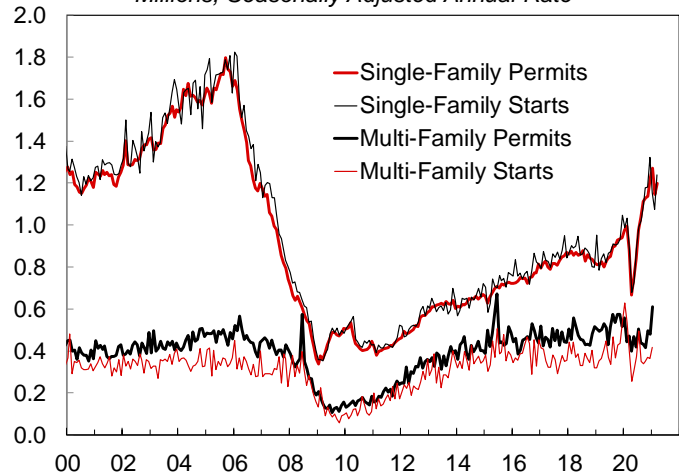


Source: U.S. Bureau of Labor Statistics/FRED

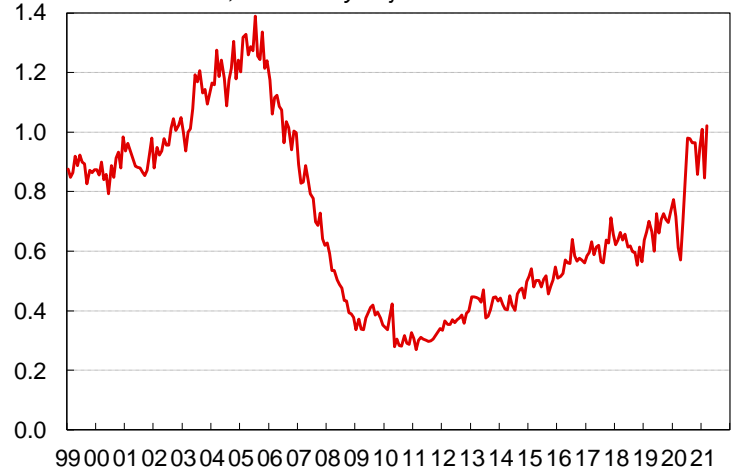
US Housing & Business Investment

- Housing starts rose in March to their highest level since June 2006.
- The seasonally adjusted annual rate of building permits for single-family homes, the most important number in the monthly residential construction report, rose in January to its highest level since August 2006. (Permits are a better indicator of housing market activity than starts because they are less sensitive to weather.)
- A decline in February and rebound in March left single-family permits below January's high but well above pre-recession levels.
- New home sales rose in March to their highest level since 2006.
- Existing-home sales (not shown) fell for a second straight month in March but were still up 12.3% year-over-year.
- The inventory of existing homes for sale remains near record lows and equaled just 2.1 months of sales in March. Tight supplies have pushed the median price of existing homes to a record high, up 17.2% over the last year. More construction is needed to meet demand.
- Investment in business equipment and investment in intellectual property products, which includes software, have risen to record highs, well above their pre-recession peaks. Companies that have gained business because of the pandemic have invested to expand their capacity.
- Investment in business structures, which include oil and gas wells, fell further in the first quarter, but the rate of decline slowed.
- An increase in corporate income taxes and capital gains taxes, other things equal, would be expected to reduce business investment.

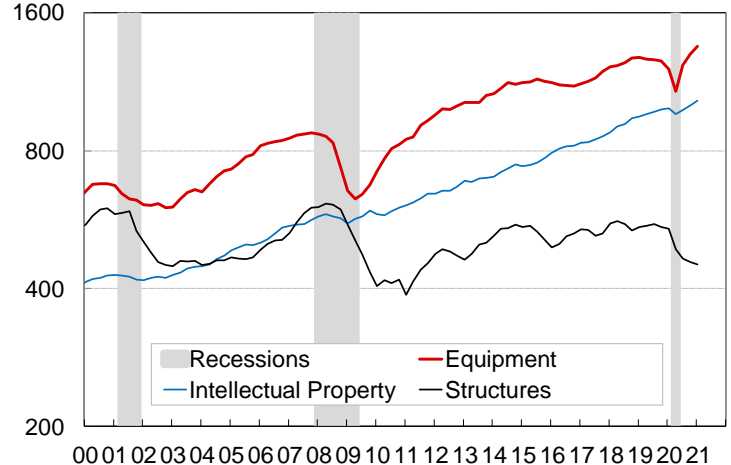
US Housing Starts & Building Permits
Millions, Seasonally Adjusted Annual Rate



US New Single-Family Home Sales
Millions, Seasonally Adjusted Annual Rate



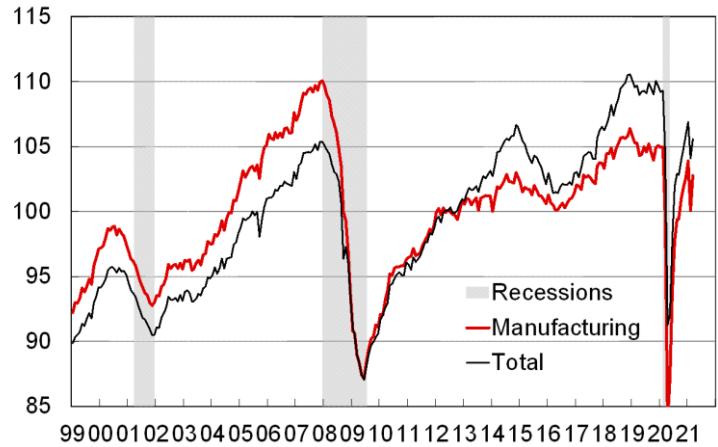
US Nonresidential Fixed Investment
Billion Chained 2012 Dollars



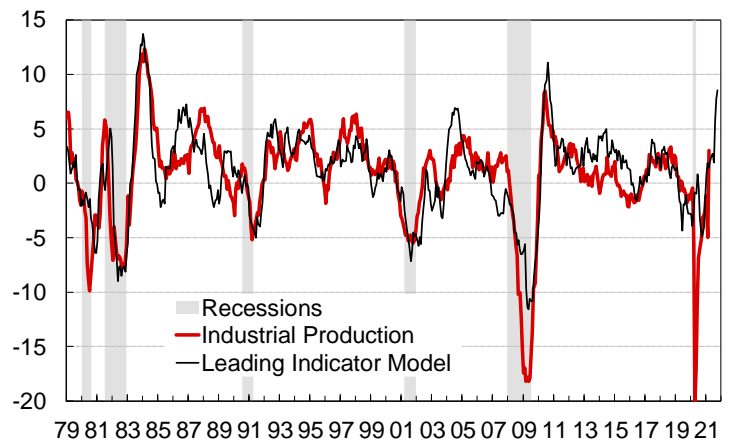
Industrial Production & Leading Indicators

- Industrial production in U.S. manufacturing, which fell 20.1% from February to April 2020, recouped 95.2% of that decline by January 2021.
- Production fell sharply in February because of cold weather in Texas and a semiconductor shortage, which reduced chemical and motor vehicle production, respectively. Production rebounded in March but stayed below January's post-recession high.
- Recovery will be slowed this year by shortages of labor and semiconductors but bolstered next year by inventory restocking.
- Industrial production for manufacturing (excluding computers, communication equipment, and semiconductors) was up 3.0% year-over-year in March, albeit from recession levels.
- Year-over-year growth will surge in April as the prior-year comparison gets even easier.
- My leading indicator model suggests that year-over-year growth will remain strongly positive over the next six months. That mostly reflects weakness in 2020 as the model suggests that growth will slow as production returns to pre-recession levels.
- The Organization for Economic Cooperation and Development (OECD) publishes leading indicators for OECD members and six non-member developing countries. Their broadest leading indicator is highly correlated with year-over-year growth in global industrial production.
- The OECD "leading" indicator doesn't lead by much, if at all, but because it doesn't change direction often, it can confirm whether an apparent turning point in growth in industrial production is a true turning point or just statistical "noise". The indicator plummeted from January to April 2020 and has rebounded strongly since then.

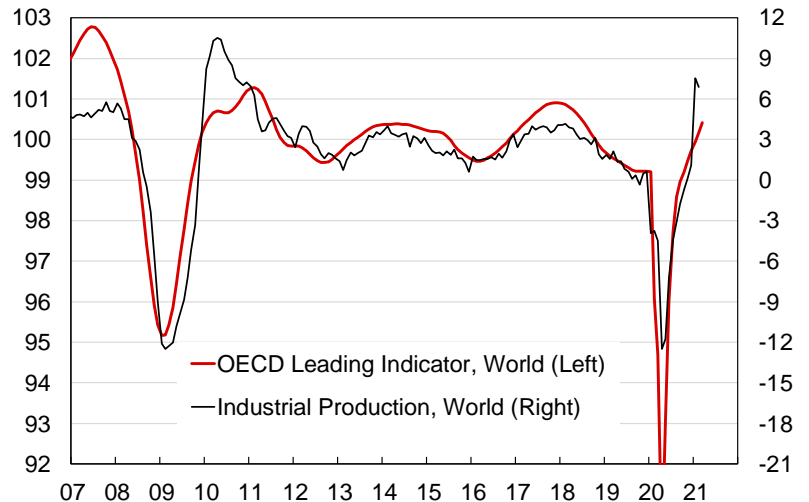
US Industrial Production
Indexes, 2012=100



US Industrial Production: Manufacturing ex high-tech
Percent Change from Year Ago



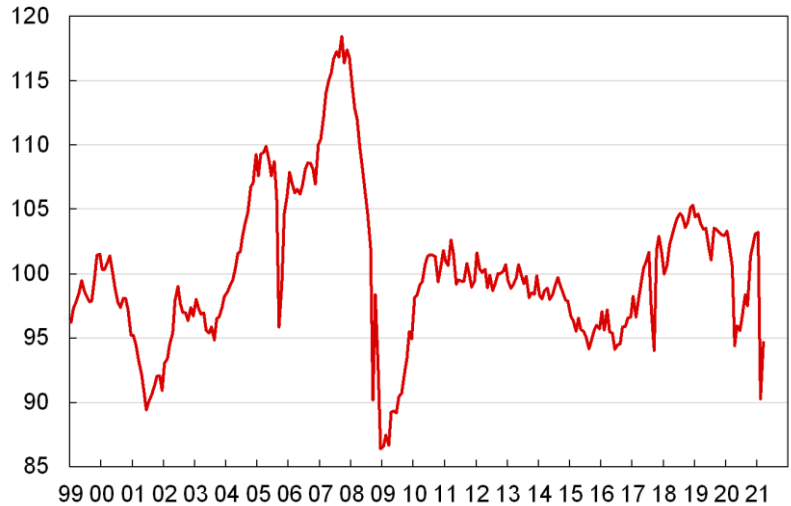
OECD Leading Indicator & Global Industrial Production
Trend = 100 *Percent Change from Year Ago*



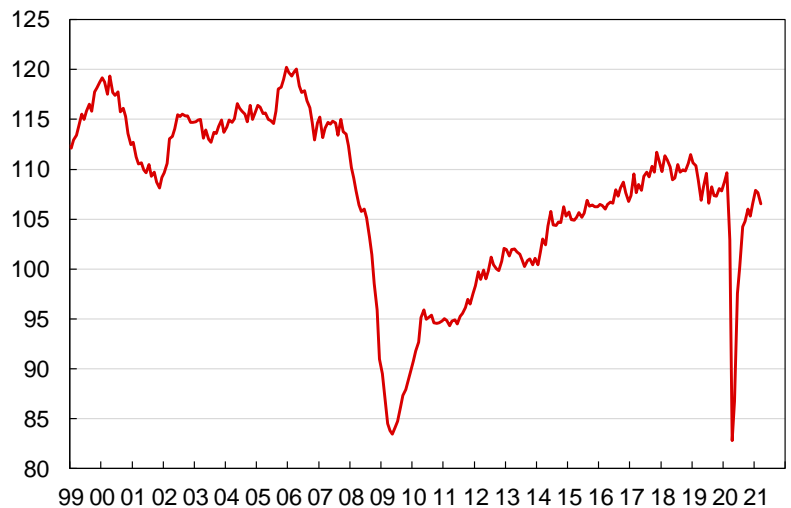
US Industrial Production

- Industrial production of chemicals (excluding pharmaceuticals), which suffered a relatively small decline during the recession and had almost fully recovered by January, fell 12.5% in February. It rose 4.9% in March but was still at roughly the same level it reached at the depths of the 2020 recession.
- Extreme cold weather in Texas was responsible for the February decline. Damage caused by the freeze was still restraining chemical production in March; repairs (e.g., to valves) have been slowed by a shortage of supplies.
- U.S. industrial production of plastic and rubber products, which had recouped 93.3% of its recession decline by January, fell 1.3% in February and March.
- Production is being restrained by problems in both the chemical industry, its main source of raw materials, and the auto industry, its biggest market.
- Even though natural gas liquids are the primary feedstock for the North American chemical industry, industrial chemical prices are more highly correlated with global oil prices than with natural gas prices because oil-based imports are the marginal source of supply. However, supply constraints caused chemical prices to rise much more than oil prices in March.
- The Producer Price Index for industrial chemicals rose 10.1% in March. This was the biggest monthly increase since 1974 and left the index at its highest level since September 2014.

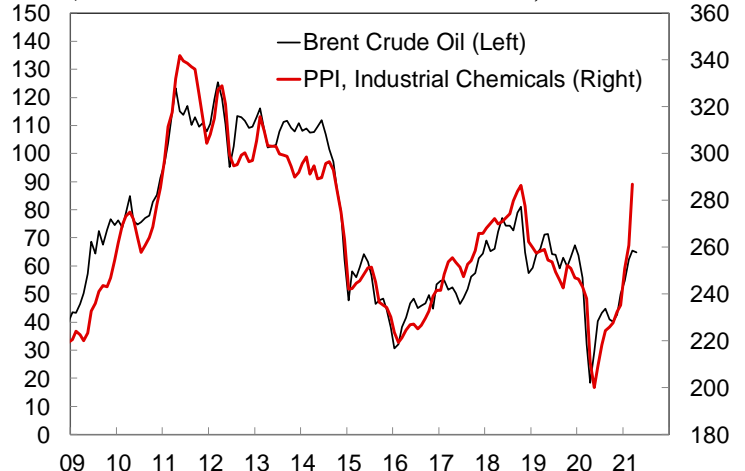
US Industrial Production: Chemicals ex pharma
Index, 2012=100



US Industrial Production: Plastic & Rubber Products
Index, 2012=100



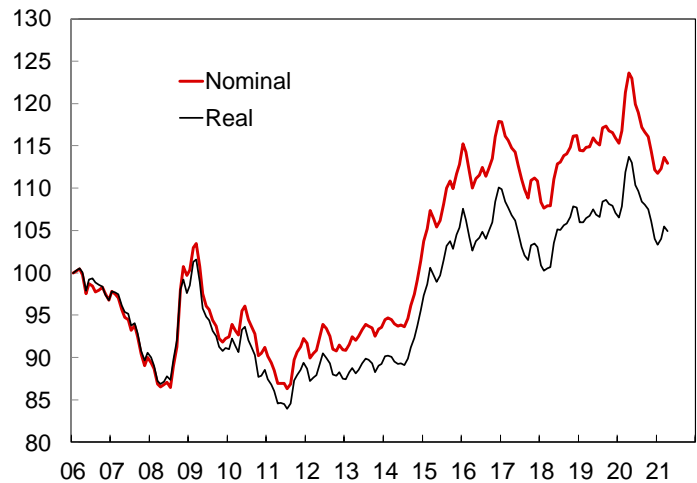
Brent Oil Price vs Industrial Chemical Prices
\$/Barrel (Left) Index, 1982 = 100 (Right)



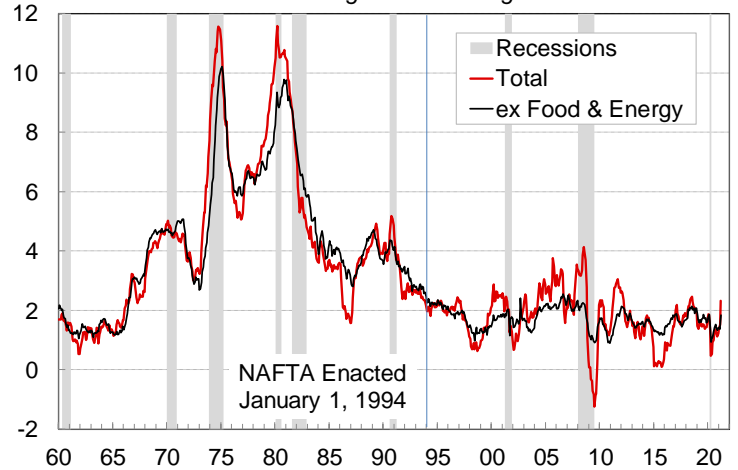
Exchange Rates, Inflation, and Interest Rates

- Except for a brief upturn in March, the trade-weighted foreign exchange value of the U.S. dollar has declined since last May. Despite this decline, the value of the dollar remains relatively high by historical standards in both nominal and real (inflation-adjusted) terms.
- A “strong” dollar reduces the global competitiveness of U.S.-produced goods, especially in agriculture, manufacturing, and mining. Further declines in the value of the dollar would help those industries but at the cost of higher inflation.
- The U.S. Federal Reserve seeks to keep inflation, as measured by the year-over-year change in the Personal Consumption Expenditure Price Index averaged over a period of years, near 2%.
- The total PCE Price Index was up 2.3% year-over-year in March, the first time that inflation had exceeded 2% since 2018. The “core” (excluding food and energy) index was up 1.8% but has risen at a 2.9% annual rate over the last four months.
- The Fed has indicated that it won’t raise interest rates until inflation rises above 2% and remains there for some time.
- In response to early signs of the collapse in economic activity in 2020, the Federal Reserve cut its federal funds rate target by 1.25 percentage points, to a range of 0-0.25%. It remains there.
- The closing yield on 10-year Treasury notes rose from a record low of 0.54% on March 9, 2020 to 1.74% on March 19, 2021. It fell to 1.5% after the April jobs report.
- Rising long-term interest rates reflect stronger growth and rising inflation. They are not a threat to the economic recovery. Economists, particularly those at the Fed, overstate the impact of long-term rates.

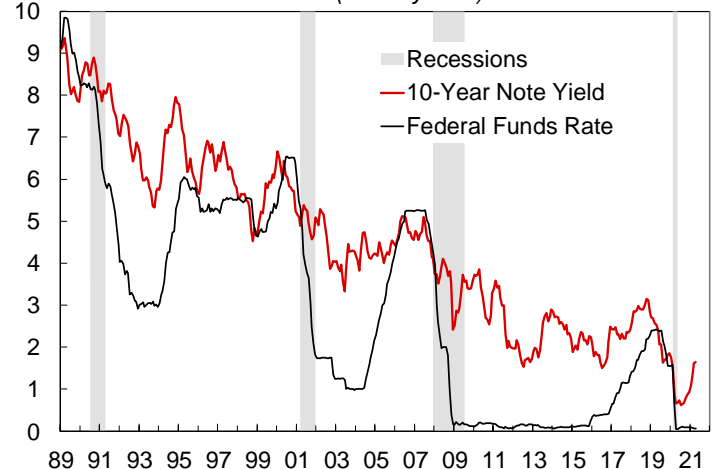
Federal Reserve Broad Dollar Index



US Personal Consumption Expenditures Price Index
Percent Change from Year Ago



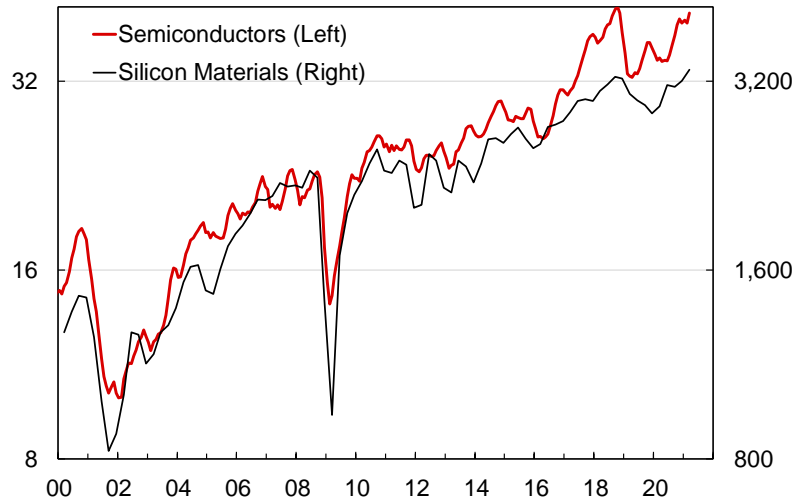
US Interest Rates
Percent (Monthly data)



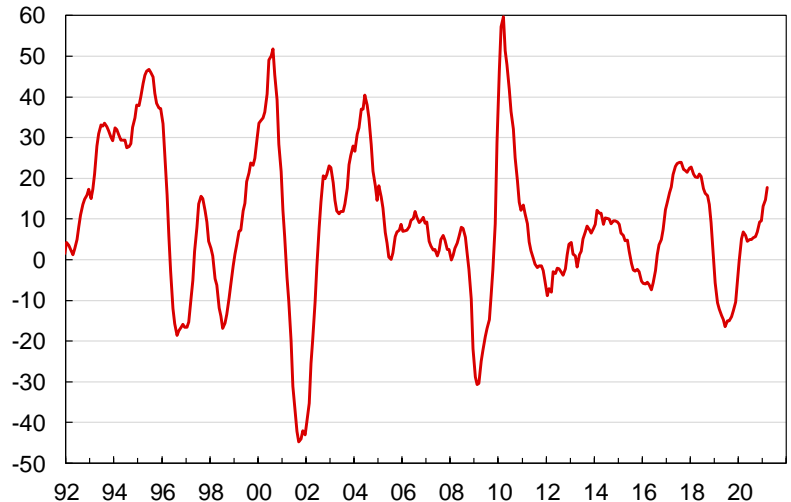
Electronics & Communication

- Shipments of silicon materials are a good indicator of global demand for products going into the electronics industry. Shipments rose to a record high in the first quarter and were up 14.3% year-over-year.
- The data (from SEMI®) are only reported quarterly back to 2000, but silicon wafer area (in square inches) has been strongly correlated with semiconductor shipments (in dollars), which are reported monthly back to 1976.
- Worldwide semiconductor shipments, reported by the Semiconductor Industry Association, rose in the first quarter but are still slightly below the record high set in the third quarter of 2018.
- Semiconductor shipments, which grew in 2020 despite the pandemic and recession, were up 17.8% year-over-year in the first quarter.
- Further strong growth will be needed to eliminate the global semiconductor shortage.
- Industrial production of wire and cable used in communication and energy applications fell by two-thirds from its 2000 peak to its 2009 trough. The recovery from 2009 to 2019, while significant in percentage terms, erased little of the 2001-2009 decline.
- Wire and cable production, which was already down from the 11-year high hit in June 2019, fell 12.7% from January 2020 to July 2020. It has since recouped about two-thirds of that decline.
- Demand for wire and cable has been hurt by office closures and the decline in nonresidential construction.

Worldwide Semiconductor & Silicon Material Shipments
Million\$, 3-Month Moving Average Million Square Inches



Worldwide Semiconductor Shipments
Percent Change from Year Ago, 3-Month Moving Average

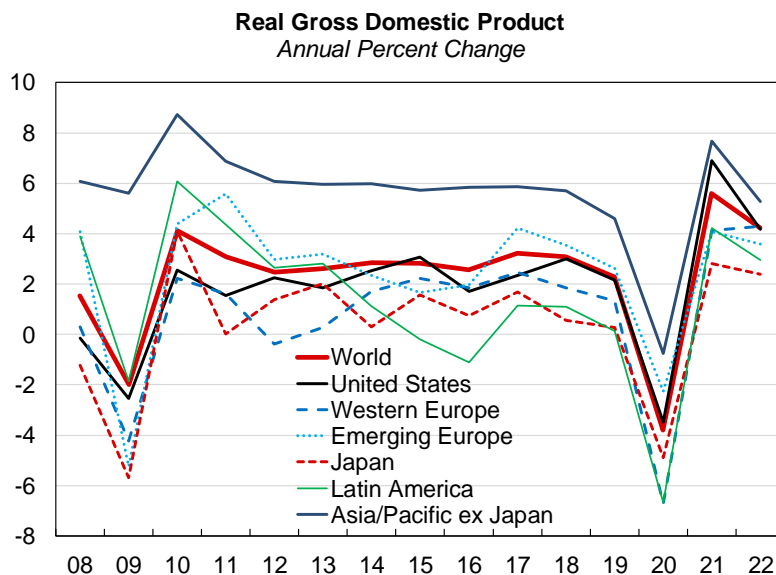


US Industrial Production: Wire & Cable
Index, 2012=100

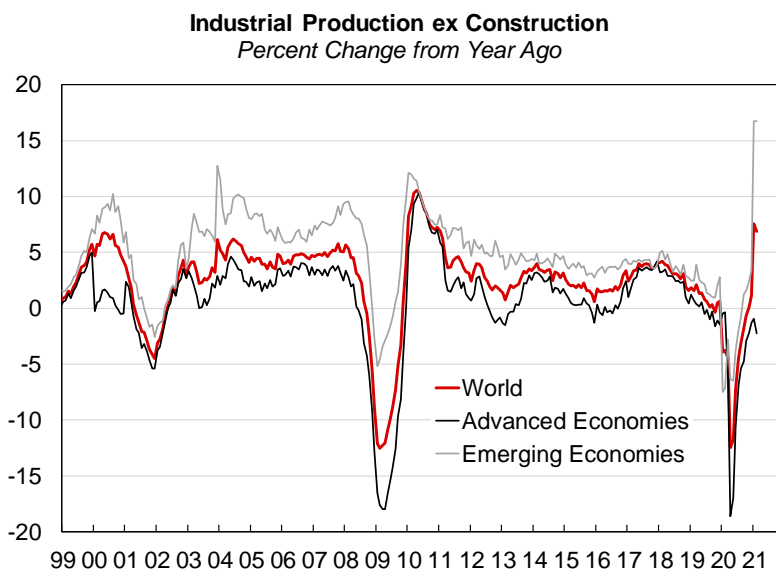
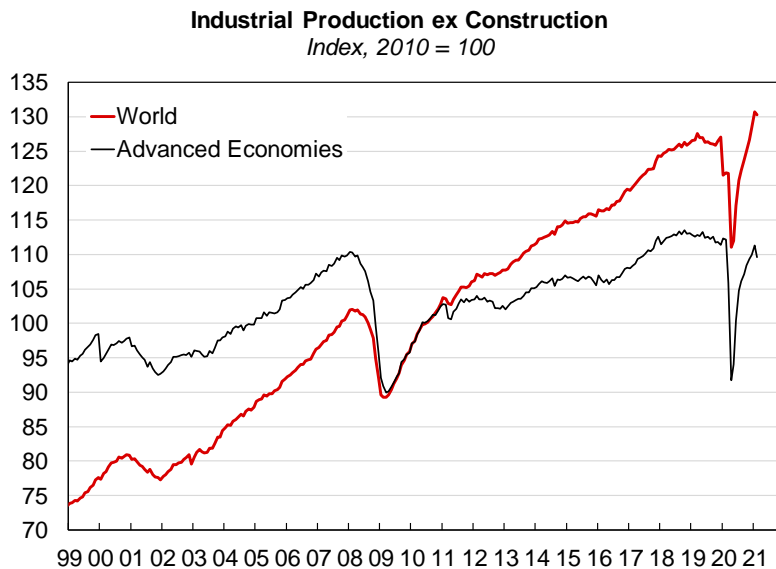


Global Macroeconomic Overview

- Global real Gross Domestic Product (based on market exchange rates, not purchasing power parity) fell 3.8% in 2020. It was the biggest decline since the Great Depression but was not as big as expected a year ago.
- Strong growth is expected in 2021 and 2022, led by China and the United States. GDP is expected to rise 5.6% in 2021 and 4.2% in 2022.



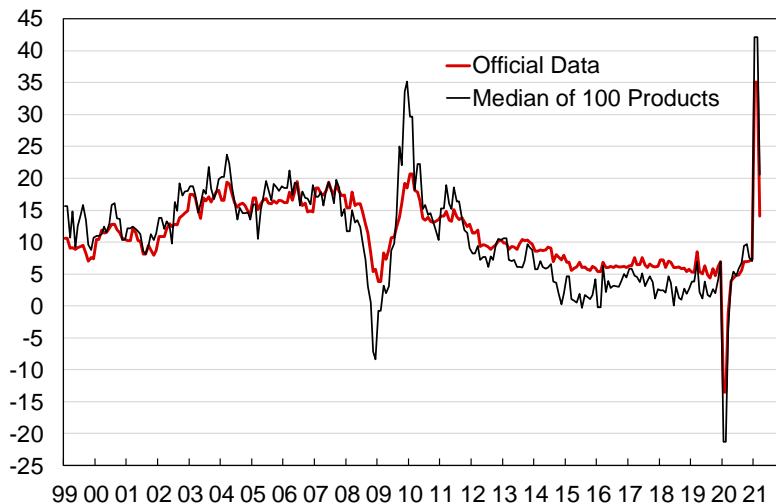
- Global industrial production, as measured by the CPB Netherlands Bureau for Economic Policy Analysis, declined 12.5% from December 2019 to April 2020.
- By December 2020, production had risen above its pre-recession peak to a record high, driven by a strong recovery in China.
- Industrial production in the Advanced Economies has not fully recovered and fell in February due to bad weather in the United States, surging COVID-19 cases in the much of the world, and a global semiconductor shortage.
- Global industrial production was up 6.9% year-over-year in February. It had been down as much as 12.5% year-over-year in April 2020. That was the largest year-over-year decline since February 2009, at the depths of the 2008-2009 recession.
- Industrial production in Emerging Economies has rebounded strongly, led by China; it was up 16.7% year-over-year in January and February.
- Industrial production in Advanced Economies was still down 2.3% year-over-year in February.



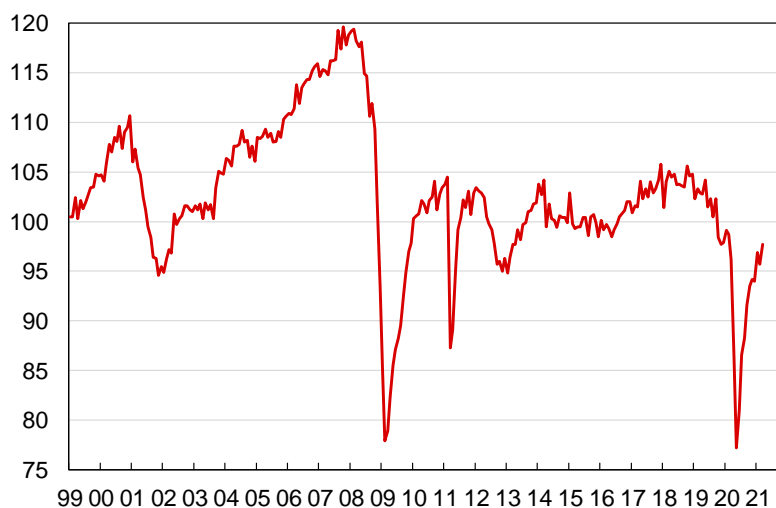
Asia

- China's economy rebounded quickly and has fully recovered from a sharp decline in the first two months of 2020.
- Value Added of Industry, China's official measure of industrial production, was up 14.1% year-over-year in March from a prior-year level that was depressed by the COVID-19 pandemic. It was up 12.8% (6.2% annual rate) from March 2019.
- My preferred measure of growth in industrial production, the median year-over-year growth rate of 100 industrial products, stood at 20.6% in March.
- Industrial production in Japanese manufacturing had been in decline even before the COVID-19 pandemic.
- Production in March was just 1.4% below its January 2020 level, but it was 7.7% below its December 2017 level and 18.3% below the record high set in 2007.
- India has been hit very hard by the COVID-19 pandemic. Industrial production in manufacturing collapsed in March and April 2020, leaving it down 67% year-over-year.
- Production rebounded strongly thereafter and had fully recovered by January 2021.
- The recent resurgence in COVID-19 cases presumably caused economic activity to contract in March and April.
- The International Monetary Fund forecasts GDP growth of 12.5% in 2021 after an 8.0% decline in 2020, but the recent resurgence calls that into doubt.

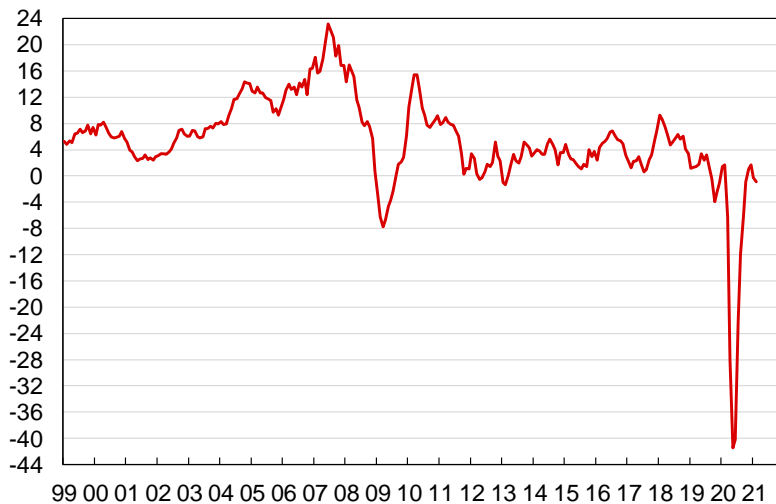
Value Added of Industry (Industrial Production): China
Percent Change from Year Ago



Industrial Production, Manufacturing: Japan
Index, 2015 = 100



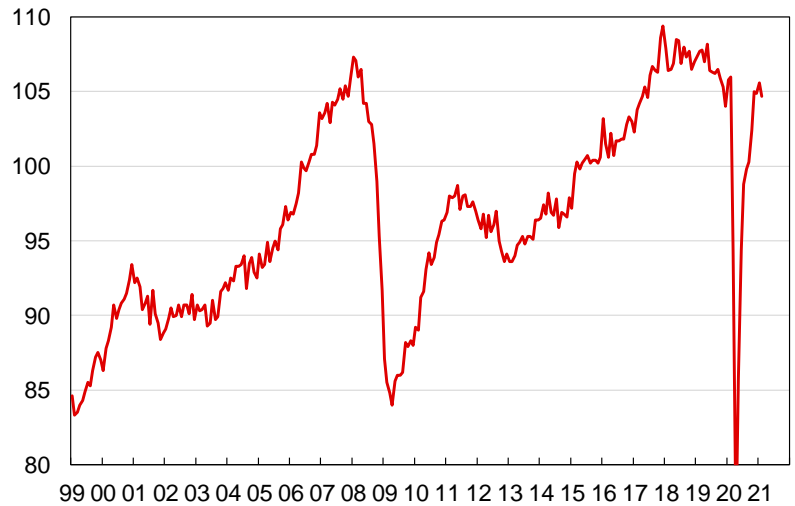
Industrial Production, Manufacturing: India
Percent Change from Year Ago, Smoothed



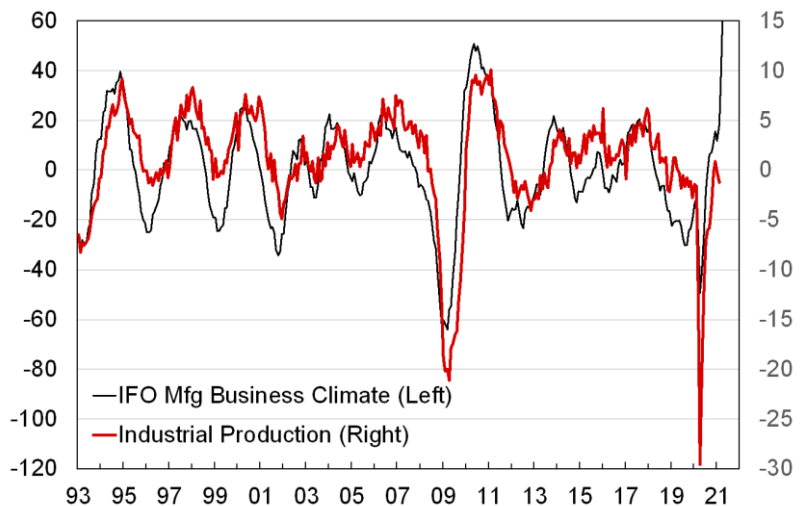
Europe

- Real GDP in the European Union, which no longer includes the United Kingdom, declined 0.4% (-1.5% annual rate) in the first quarter. It was the second decline in a row and fourth in the last five quarters. It left GDP 5.0% below its pre-recession high.
- Industrial production in EU manufacturing fell 29% from February 2020 to April 2020. By January 2021, it had recouped almost 99% of that decline, but it fell slightly in February, leaving it down 1.2% year-over-year.
- The 12-month change in the German IFO manufacturing business climate index has historically led year-over-year growth in EU manufacturing production by three months and is reported in a timelier manner.
- The IFO index plummeted in March and April 2020 to its lowest level since March 2009. It has since gradually recovered and rose in April to its highest level since 2018. Its 12-month change rose to its highest level ever. This suggests that manufacturing will continue to recover and that year-over-year growth in industrial production will soon turn strongly positive.
- Industrial production in manufacturing has rebounded to new record highs in Poland and Hungary and is nearing record highs in the Czech Republic.

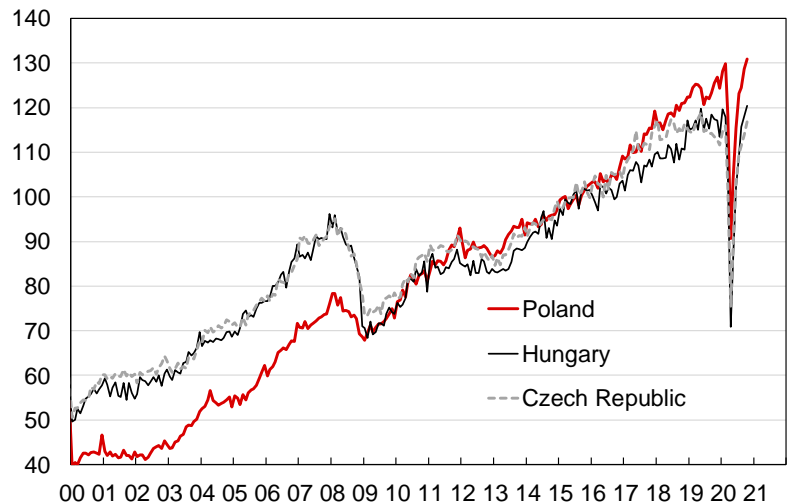
Industrial Production, Manufacturing: European Union
Index, 2015 = 100



Industrial Production, Manufacturing: European Union
Change/Percent Change from Year Ago



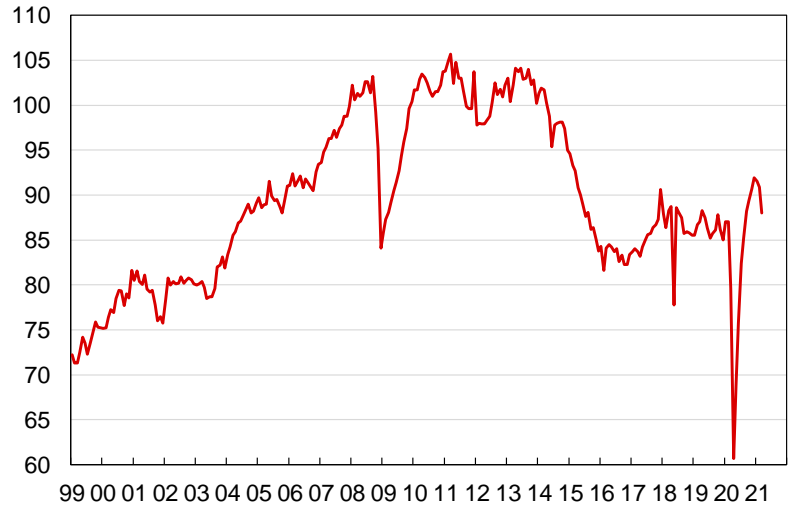
Industrial Production, Manufacturing: Central Europe
Index, 2015 = 100



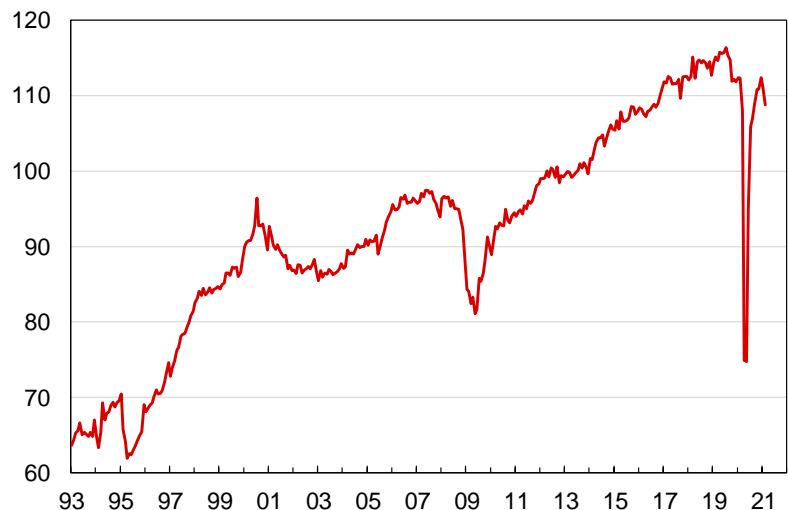
Americas

- By December 2020, industrial production in Brazilian manufacturing had more than fully recovered from the 30.2% decline in March and April 2020, even though Brazil has been hit hard by the COVID-19 pandemic.
- Production fell in January, February, and March as the number of new COVID-19 cases rose to a record high. (The number of new cases peaked in late March.)
- Despite the surprisingly strong rebound over the last eight months of 2020, production remains more than 15% below the peak reached in 2011.
- As of December 2020, industrial production in Mexican manufacturing had fully recovered from the 33.5% decline from January to May but not from the decline in the second half of 2019.
- Production fell in January and February.
- Despite two quarters of recovery, real Gross Domestic Product was 5.5% lower in the fourth quarter of 2020 than in the third quarter of 2019.
- Unlike most countries, Canada reports Gross Domestic Product monthly rather than quarterly and for various sectors of the economy.
- Real GDP in manufacturing, which is comparable to industrial production in other countries, fell 28.7% in March and April 2020. By January, it had recouped 85% of its losses.
- After a small decline in February, it was down 3.3% year-over-year.

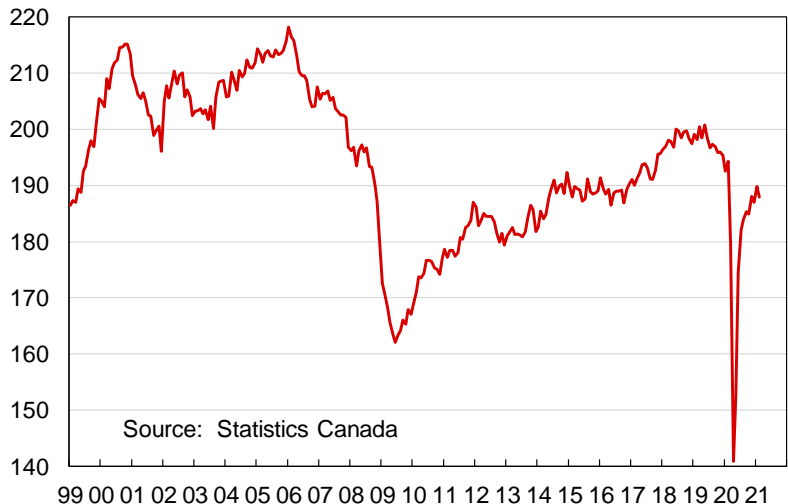
Industrial Production, Manufacturing: Brazil
Index, 2012 = 100



Industrial Production, Manufacturing: Mexico
Index, 2013 = 100



Real GDP at Basic Prices, Manufacturing: Canada
Billion 2012 Chained Canadian Dollars



Global GDP Growth

	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>
World	3.2	3.1	2.3	-3.8	5.6	4.2	3.0	2.7	2.7
North America	2.4	2.9	2.1	-3.7	6.8	4.1	2.0	1.3	1.6
United States	2.3	3.0	2.2	-3.5	6.9	4.2	2.0	1.3	1.6
Canada	3.0	2.4	1.9	-5.4	5.9	3.8	2.2	1.4	1.8
Mexico	2.1	2.2	-0.1	-8.2	4.4	3.0	2.1	2.0	2.0
Western Europe	2.4	1.8	1.3	-6.7	4.1	4.3	2.0	1.7	1.5
France	2.3	1.9	1.5	-8.2	5.3	3.9	2.0	1.6	1.4
Germany	2.6	1.3	0.6	-4.9	3.3	4.1	1.6	1.5	1.2
Italy	1.7	0.9	0.3	-8.9	3.9	4.1	2.0	1.4	1.1
Spain	3.0	2.4	2.0	-11.0	5.5	5.7	2.7	2.1	1.7
U.K.	1.7	1.3	1.4	-9.9	5.4	5.6	2.0	1.8	1.5
C & E Europe	4.2	3.5	2.6	-2.2	4.1	3.6	3.2	2.9	2.8
Middle East & Africa	1.7	1.5	1.2	-3.7	3.2	3.5	3.2	3.1	3.2
Asia/Pacific	4.9	4.5	3.7	-1.6	6.7	4.7	4.3	4.2	4.1
Japan	1.7	0.6	0.3	-4.9	2.8	2.4	1.2	1.0	0.9
ex Japan	5.9	5.7	4.6	-0.8	7.7	5.3	5.1	5.0	4.9
Australia	2.4	2.8	1.9	-2.4	4.5	2.8	2.3	2.3	2.4
China	6.9	6.7	5.8	2.3	8.7	5.5	5.4	5.3	5.1
India	6.8	6.5	4.0	-8.0	12.5	6.9	6.8	6.7	6.6
Indonesia	5.1	5.2	5.0	-2.1	4.3	5.8	5.7	5.4	5.2
Korea (South)	3.2	2.9	2.0	-1.0	3.6	2.8	2.6	2.4	2.3
Malaysia	5.8	4.8	4.3	-5.6	6.5	6.0	5.7	5.3	5.0
Philippines	6.9	6.3	6.0	-9.5	6.9	6.5	6.5	6.5	6.5
Singapore	4.5	3.5	1.3	-5.4	5.2	3.2	2.7	2.6	2.5
Taiwan	3.3	2.8	3.0	3.1	5.0	3.0	2.5	2.3	2.0
Thailand	4.2	4.2	2.3	-6.1	2.6	5.6	3.8	3.5	3.6
Vietnam	6.9	7.1	7.0	2.9	6.5	7.2	7.0	6.8	6.6
Latin America	0.9	0.8	0.2	-6.2	4.2	2.9	2.6	2.4	2.4
Argentina	2.8	-2.6	-2.1	-10.0	5.8	2.5	2.1	1.7	1.6
Brazil	1.3	1.8	1.4	-4.1	3.7	2.6	2.1	2.0	2.0

Global Industrial Production Growth

	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025</u>
World	3.6	3.1	0.9	-4.4	6.3	4.5	2.8	2.3	2.3
Advanced economies	3.1	2.4	-0.3	-6.4	5.3	3.8	2.1	1.4	1.3
United States	2.3	3.9	0.9	-6.7	5.7	4.3	2.2	1.6	1.4
Japan	2.6	1.0	-2.6	-9.7	7.0	5.0	2.0	1.5	1.2
Euro Area	3.1	1.0	-1.5	-8.8	5.0	4.0	2.0	1.0	1.0
Emerging economies	4.1	3.8	2.1	-2.3	7.7	5.3	3.7	3.5	3.5
China	6.5	6.2	5.7	2.0	10.0	5.0	4.0	4.0	4.0
Emerging Asia ex China	4.4	4.5	0.5	-5.3	6.0	5.0	4.0	4.0	4.0
E Europe & CIS	4.3	3.4	3.1	-2.5	5.0	4.0	2.5	2.0	2.0
Latin America	-0.7	-2.1	-4.9	-8.9	6.0	5.0	3.0	2.5	2.5
Middle East & Africa	0.7	1.0	-2.9	-9.5	7.0	7.0	4.0	3.5	3.5

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