

Economic Outlook

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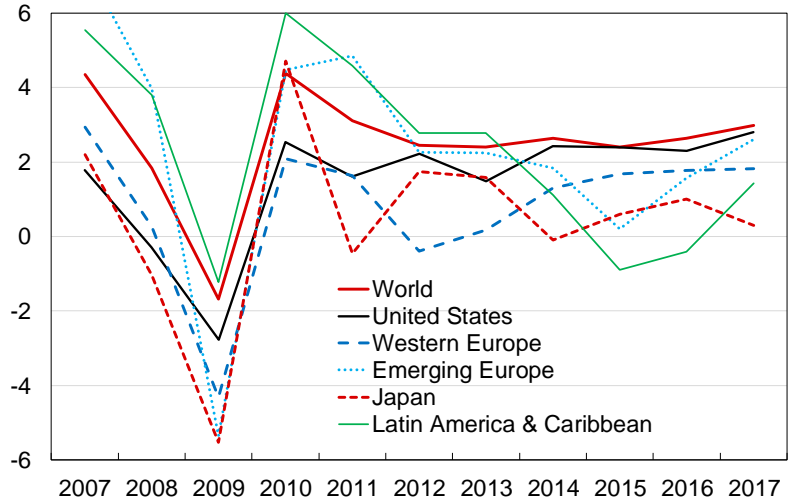
March 4, 2016

- Growth in global industrial production essentially ground to a halt in 2015. Industrial production in manufacturing rose by less than 1% from December 2014 to December 2015 in the United States and the European Union; production fell slightly in Japan and South Korea. In only a few countries, mostly in Central Europe but also including the rebounding Western European countries of Ireland, Portugal, and Spain, has industrial production grown at a significantly faster rate. At the other extreme, production has contracted sharply in Russia and has collapsed in Brazil. Official data show strong growth in industrial production in China, but data on individual industrial products suggest that production was essentially flat in 2015. In most countries, total industrial production, which includes mining, has performed much worse than industrial production in manufacturing. Purchasing Managers Indexes and early-2016 data available for a few countries suggest that the deceleration in industrial production might be coming to an end, but so far there is no evidence of a significant reacceleration.
- U.S. real Gross Domestic Product rose at a 1.0% annual rate in the fourth quarter of 2015. Growth was held down a decline in business fixed investment, due largely to a decline in oil and gas drilling, by reduced demand for U.S. exports caused by a strong dollar and weak growth abroad, and by a slowdown in the pace of inventory accumulation. Consumer spending and residential investment have continued to grow at healthy rates. Because of these international influences, manufacturing is underperforming GDP. Industrial production in U.S. manufacturing rose 0.5% in January to its highest level since 2008, but was up just 1.2% from year-earlier levels.
- Real GDP for the European Union rose 0.3% in the fourth quarter of 2015. It was the 11th straight quarterly increase, but the smallest increase of the year. GDP was up 1.9% year-over-year. Real GDP in the Euro-Zone, which does not include the rapidly growing United Kingdom and some strong performers in Central Europe, also rose 0.3% and was up 1.6% year-over-year. Industrial production in European Union manufacturing was up just 0.5% year-over-year after declining in both November and December. Purchasing Managers Indexes for all Euro-Zone economies except Greece are above the neutral level of 50, but just barely, suggesting little growth in manufacturing in coming months.
- The Japanese economy continues to fluctuate around a flat trend. Real GDP in Japan declined in both the second and fourth quarters of 2015. Industrial production in Japanese manufacturing jumped in January to its highest level in a year, but remains well below its early-2008 peak and is no higher than it was in the early 1990s. The economies of Japan and Korea are being hurt by weak demand from China.
- China continues to report growth that is strong by global standards, but actual growth is much slower than official data indicate. Value Added of Industry, China's official measure of industrial production, was up 5.9% year-over-year in December, but my measure, based on production of 73 industrial products, was up just 1.9%.
- Industrial production in Brazilian manufacturing fell 21.6% from June 2013 to December 2015, leaving it only 0.1% above its December 2008 recession low. With the possible exception of neighboring Venezuela, Brazil is the worst-performing economy in the world.
- Global real GDP is expected to rise 2.6% in 2016, about the same as in the four prior years. With inflation starting to creep up, nominal GDP growth, which is what determines growth in revenues and corporate profits, will pick up in 2016, but will remain very low by historical standards. Global industrial production is expected to rise 1.9% in 2016, the same as in 2015.

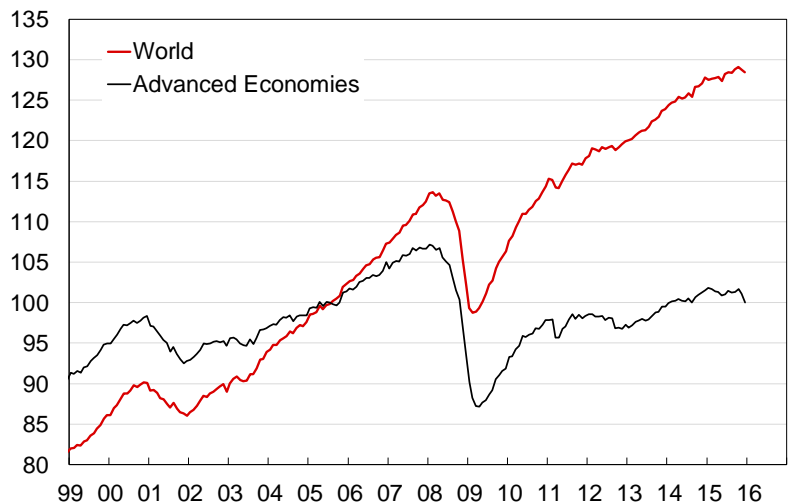
Global Macroeconomic Overview

- Global real GDP is estimated to have risen 2.4% in 2015, marking the fourth straight year of growth in the 2-4-2.6% range. Growth is expected to remain in that range again in 2016.
- There was an underappreciated acceleration in European growth from 2012 to 2015, but it has stalled.
- Growth remains highest in the Asia/Pacific region, excluding Japan, but growth there has clearly downshifted in recent years. Asia/Pacific growth is not shown on the chart because it distorts the scale and because Chinese data are not credible.
- Global industrial production has stagnated since late 2014, even if data from China, which significantly overstate growth, are included.
- Although global industrial production is near an all-time high, production in the Advanced Economies has fallen back to early-2014 levels and remains well below its early-2008 peak.
- Year-over-year growth in global industrial production has fallen almost to zero.
- Year-over-year growth is positive only in the developing countries of the Asia/Pacific and Middle East & Africa regions.
- Because total industrial production includes mining, which has been hit hard by falling oil and gas prices and declining commodity demand, it is growing more slowly than industrial production in manufacturing.

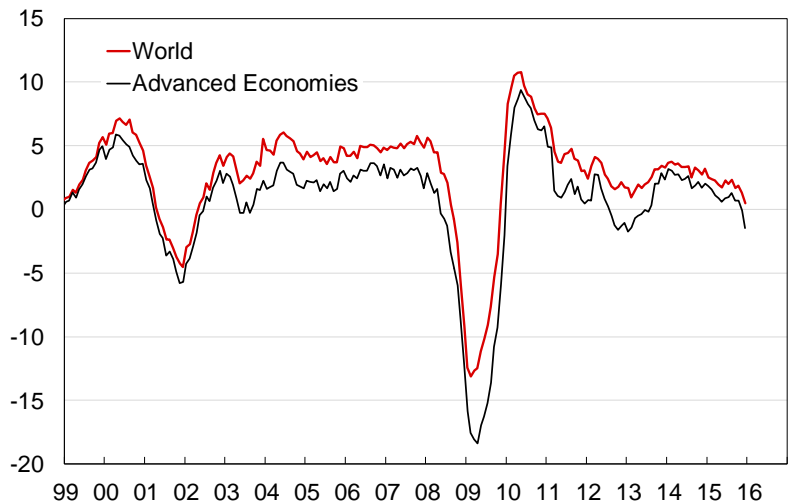
Real Gross Domestic Production
Annual Percent Change



Industrial Production ex Construction
Index, 2005 = 100



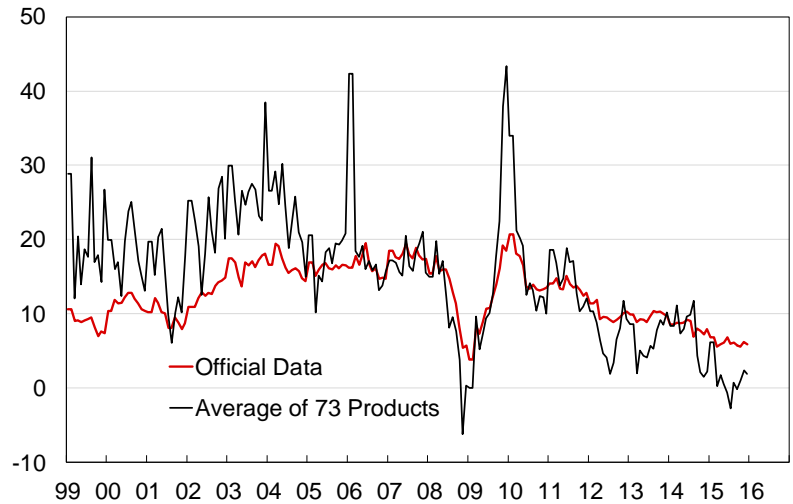
Industrial Production ex Construction
Percent Change from Year Ago



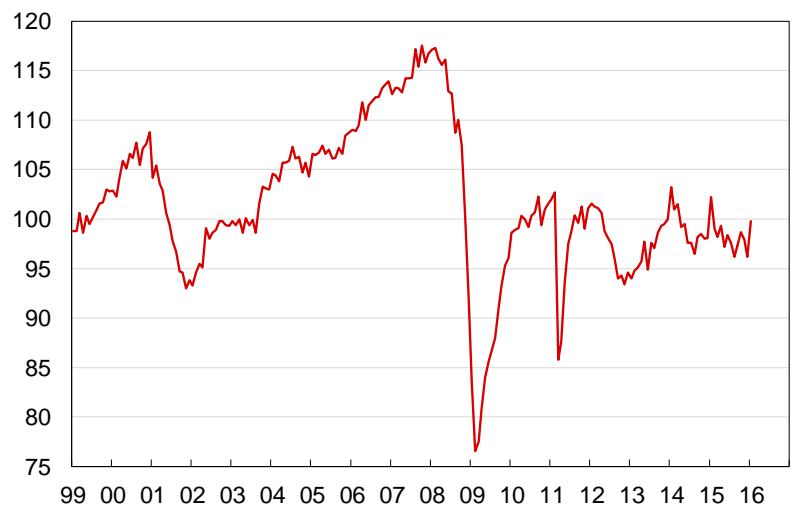
Global Macroeconomic Overview

- Value Added of Industry, China's official measure of industrial production, was up just 5.9 year-over-year in December.
- My alternative index based on production of 73 industrial products was up just 1.9%.
- The Markit PMI index for Chinese manufacturing fell to 48.0 in February and has been slightly below the neutral level of 50 for 12 straight months.
- Growth in Chinese manufacturing seems to have stabilized around zero. It is neither collapsing nor reaccelerating.
- Japan's economy continues to fluctuate around a flat trend; real GDP fell in the second and fourth quarters of 2015.
- Industrial production in Japanese manufacturing jumped in January to its highest level in a year, but remains well below its early-2008 peak and is no higher than it was in the early 1990s.
- Industrial production in Korean manufacturing has been essentially flat for four years.
- The stagnation in Korean manufacturing is due to weak demand for exports, not to weak domestic demand. GDP, which is not as dependent on exports as is manufacturing, was up 3.0% year-over-year in the fourth quarter of 2015.
- Korean manufacturing was hit first by the depreciation of the Japanese yen, then by the slowing of the Chinese economy.

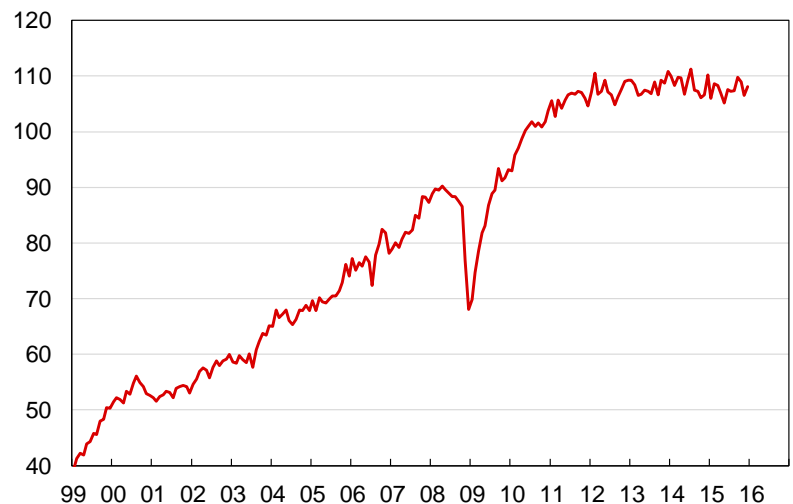
Value Added of Industry (Industrial Production): China
Percent Change from Year Ago



Industrial Production, Manufacturing: Japan
Index, 2010 = 100



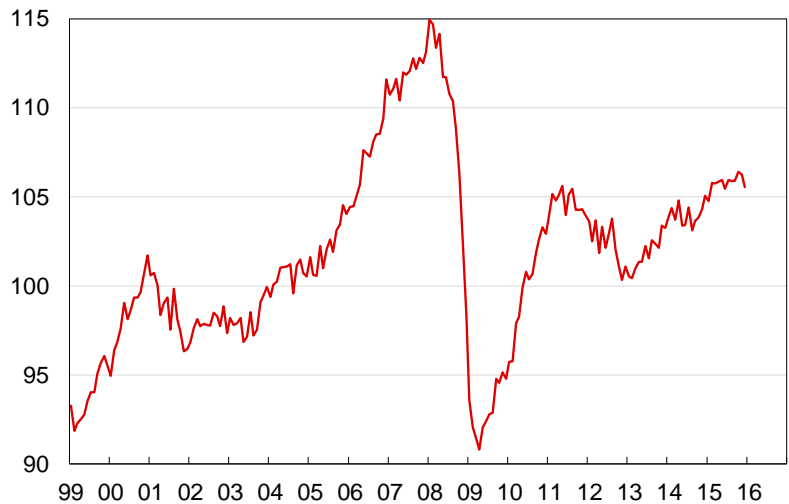
Industrial Production, Manufacturing: South Korea
Index, 2010 = 100



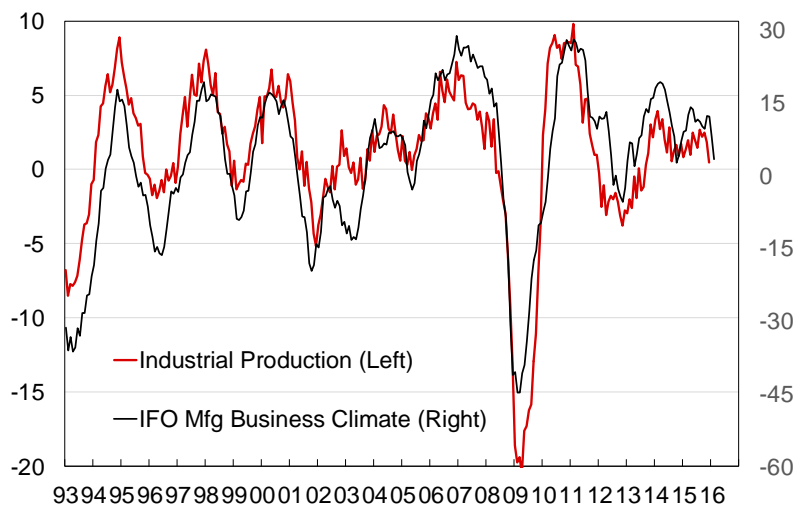
Global Macroeconomic Overview

- Industrial production in European Union manufacturing slipped in November and December, leaving it up just 0.5% year-over-year in December. It is still well below its early-2008 peak.
- European manufacturing has been hurt by weak demand for capital goods in China, but has been helped by the weakening of the Euro versus the U.S. dollar.
- The 12-month change in the German IFO manufacturing business climate index has historically led year-over-year growth in European Union manufacturing production by three months and is reported in a timelier manner.
- The IFO index fell sharply in January and February, taking it to the lowest level since October 2014. The index suggests that year-over-year growth in industrial production remains close to zero.
- Industrial production in manufacturing has declined recently in the Czech Republic, but remains near record highs in Poland and Hungary. From a manufacturing standpoint, these have been among the best-performing economies in the world over the last several years.
- Industrial production in manufacturing was up 7.7% year-over-year in Hungary in December and up 5.6% in Poland.

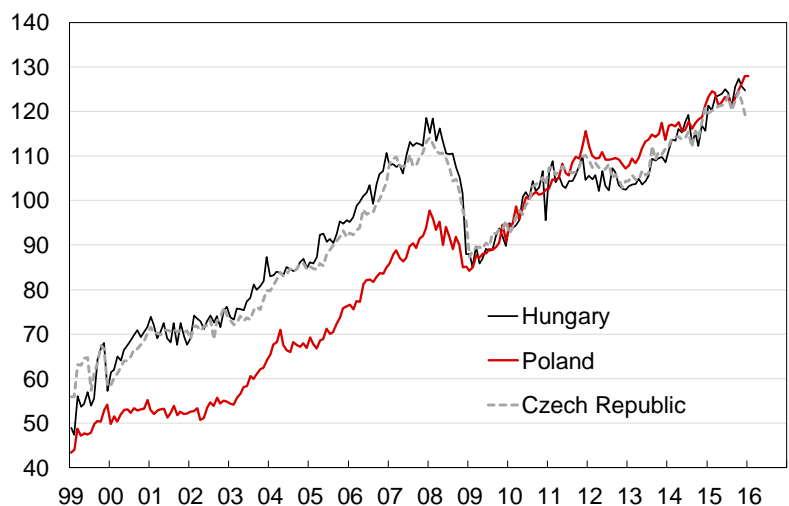
Industrial Production, Manufacturing: European Union
Index, 2010 = 100



Industrial Production, Manufacturing: European Union
Percent Change from Year Ago *Balance of Opinion*



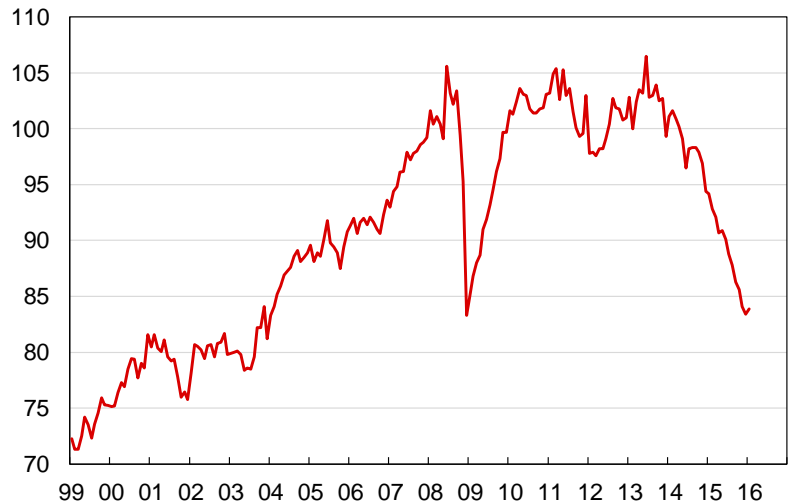
Industrial Production, Manufacturing: Central Europe
Index, 2010 = 100



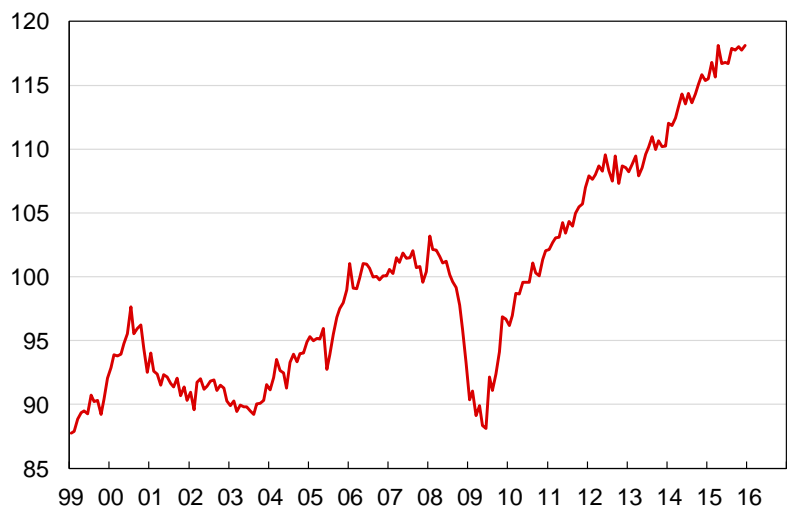
Global Macroeconomic Overview

- Brazil has been, by far, the worst-performing major economy in the world over the last two years.
- Industrial production in Brazilian manufacturing edged up in January after coming close to its 2008 low in December, but it was still down 10.9% year-over-year.
- Brazil's problems reflect a combination of slower growth in China, which has hurt commodity producers like Brazil, and the bad policies undertaken by the Brazilian government. Without new policies, Brazil will never realize its economic potential.
- Industrial production in Mexican manufacturing continues to trend upward but at a slowing rate. Production was up 2.4% year-over-year in December and is up nearly 15% from its 2008 pre-recession high.
- Although better economic policies have not boosted growth nearly as much as some had hoped, Mexico is doing far better than most Latin American economies.
- Industrial production in U.S. manufacturing rose 0.5% in January, to its highest level since 2008, after declining in November and December. Production was up 1.2% year-over-year in January, but is still about 3% below its 2007 pre-recession peak.

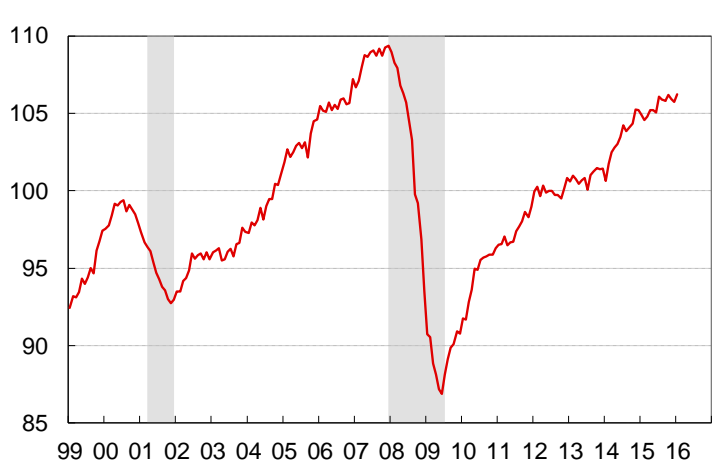
Industrial Production, Manufacturing: Brazil
Index, 2012 = 100



Industrial Production, Manufacturing: Mexico
Index, 2008 = 100



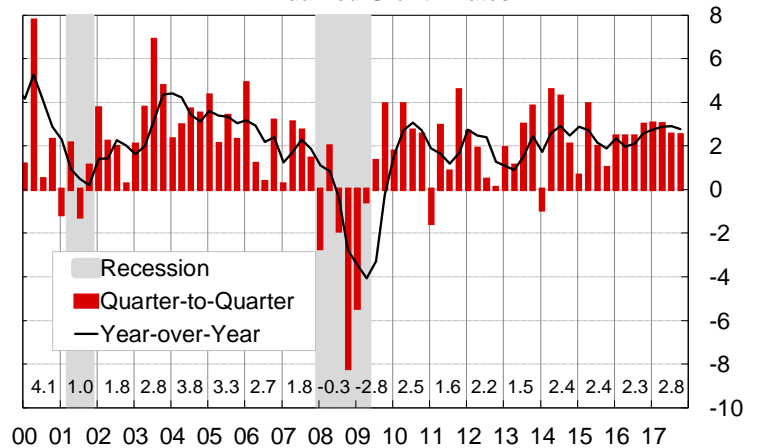
US Industrial Production: Manufacturing
Index, 2012=100



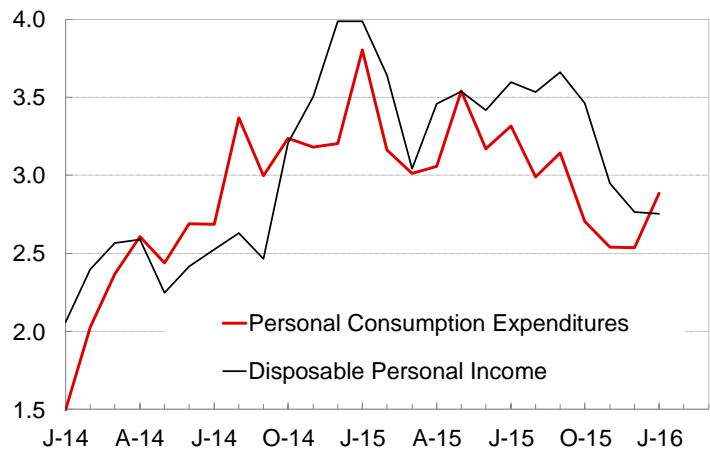
Global Macroeconomic Overview

- U.S. real Gross Domestic Product grew at a 1.0% annual rate in the fourth quarter of 2015. Year-over-year growth slowed from 2.9% in the first quarter to 1.9% in the fourth quarter.
- Growth has been held down a decline in business fixed investment, due largely to a decline in oil and gas drilling, by reduced demand for U.S. exports caused by a strong dollar and weak growth abroad, and by a slowdown in the pace of inventory accumulation. Consumer spending and residential investment have continued to grow at healthy rates.
- Growth in income and spending slowed through 2015, but remained stronger than growth in GDP.
- Income and spending both surged in January. Income growth has accelerated in recent months as wages and salaries have started to pick up in response to tighter labor markets.
- Real (inflation-adjusted) consumer spending has been boosted by the decline in oil prices. Nominal consumer spending, which determines the revenue of businesses, has not.
- Growth in nominal GDP has slowed due to both slower real growth and slower inflation. Given the relationship between corporate profits and nominal GDP, for most companies, expectations of double-digit earnings growth are not realistic, and futile efforts to achieve such growth have caused U.S. companies to cede market share to foreign competitors.
- Total corporate profits are likely to grow at a 3-5% rate once the dollar stabilizes. Earnings per share on the S&P500 can grow at a slightly faster rate.

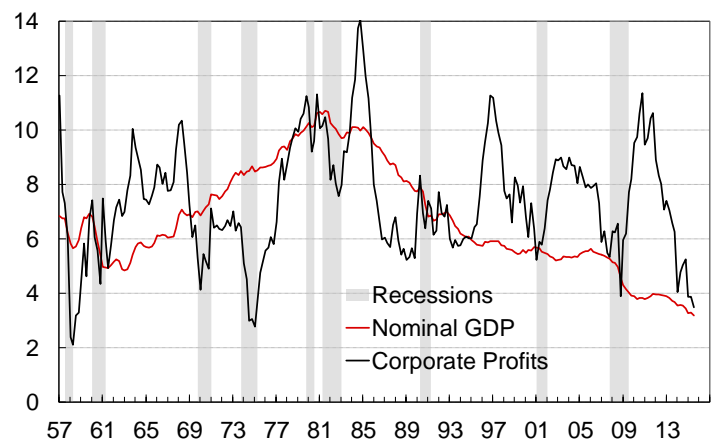
US Real Gross Domestic Product
Annualized Growth Rates



US Real Consumer Spending & Disposable Income
Percent Change from Year Ago, Chained 2009 Dollars

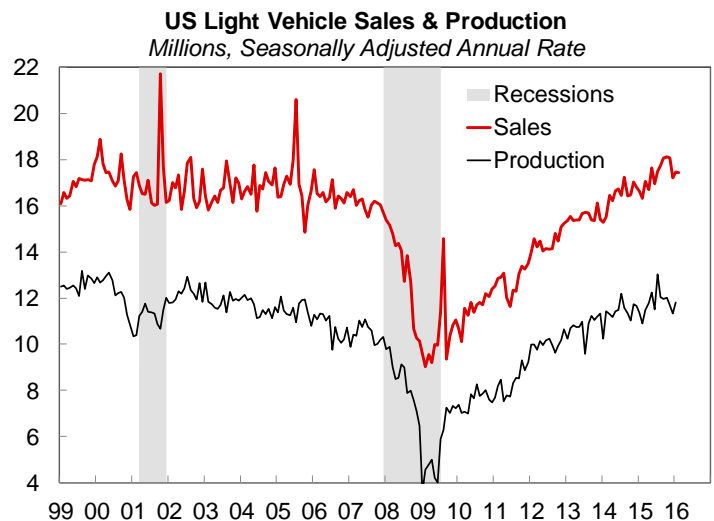
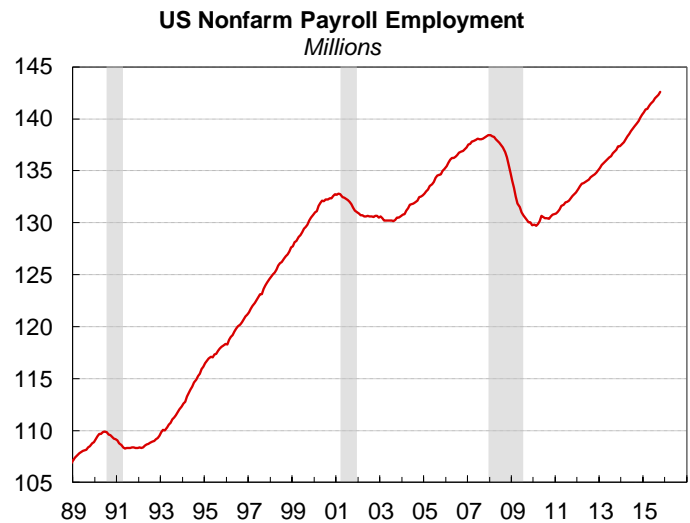


US Corporate Profits After Tax vs Nominal GDP
10-Year Annualized Growth Rate



Global Macroeconomic Overview

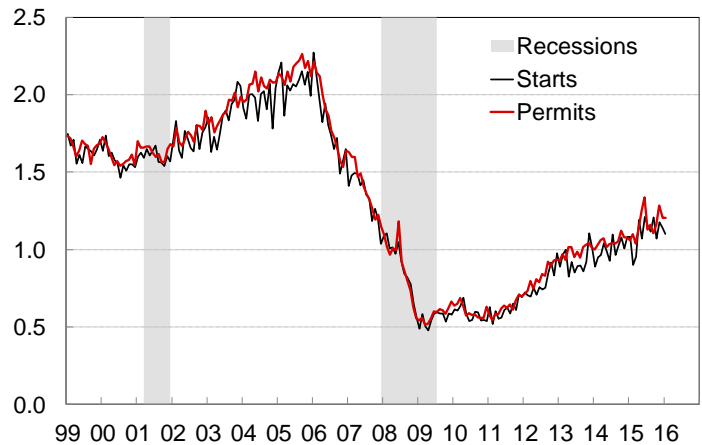
- The civilian unemployment rate has fallen to 4.9%, which the Federal Reserve regards as consistent with full employment.
- The U-6 measure of unemployment, which includes people who are working part-time but would prefer to work full-time and those who have stopped looking for a job because they are discouraged, fell to 9.7% in February. That was the lowest U-6 unemployment rate since April 2008, but was still about a percentage point higher than the level consistent with full employment.
- Nonfarm payrolls rose by 248,000 in February and have increased by an average of 252,000 over the last five months. This is much more than is required to absorb growth in the labor force. As a result, unemployment has fallen and labor markets have tightened.
- Barring the return of discouraged workers to the labor force, growth in payroll employment will soon have to slow to less than 150,000. Such a return would lower the U-6 unemployment rate but would have little impact on the headline (U-3) measure.
- Light vehicles sold at a 17.4 seasonally adjusted annual rate in February, about the same as in January, but below the 18.1 million selling rate maintained from September through November last year.
- Monthly sales might have peaked last fall, but with no sign of an impending decline, annual sales are likely to hit another record high this year.
- Sales are being boosted by both solid employment growth and the big decline in fuel prices since mid-2014. Historically, employment growth is one of the most important drivers of motor vehicle sales.



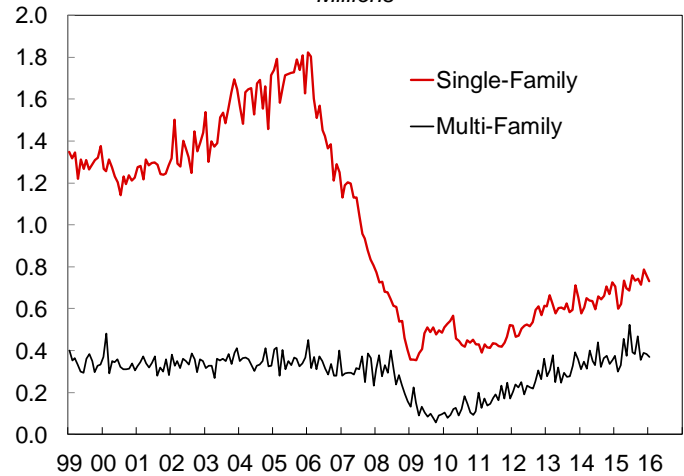
Global Macroeconomic Overview

- While large month-to-month fluctuations make it hard to discern the underlying trend, U.S. housing starts have grown by 125,000 per year for the last four years. Demographics favor a stronger rebound, but supply-chain constraints and cautious lending standards are preventing that.
- Because housing permits are less sensitive to weather than are starts and lead starts slightly, they are a better indicator of housing market conditions than are starts. Permits significantly exceed starts, suggesting that starts will rise in coming months.
- Multi-family structures (apartments and condominiums) account for much of the recovery in housing starts since the recession. The “lumpiness” of multi-family starts also accounts for much of the volatility in starts over the last few years.
- The increase in multi-family starts might reflect difficulties in qualifying for a mortgage stemming in part from student-loan debt, but it also reflects a generational shift in locational preferences and attitudes towards home ownership.
- Existing home sales plunged in November 2015 because of delays in closing caused by new federal requirements governing mortgage forms. Sales quickly rebounded in December and rose further in January. Despite month-to-month fluctuations, an upward trend remains intact. However, sales are being held back by a lack of houses on the market.
- New home sales fell in January and have been flat over the last year, but difficulties in seasonally adjusting data that are so dependent on weather might be obscuring a continued, albeit slow, upward trend.

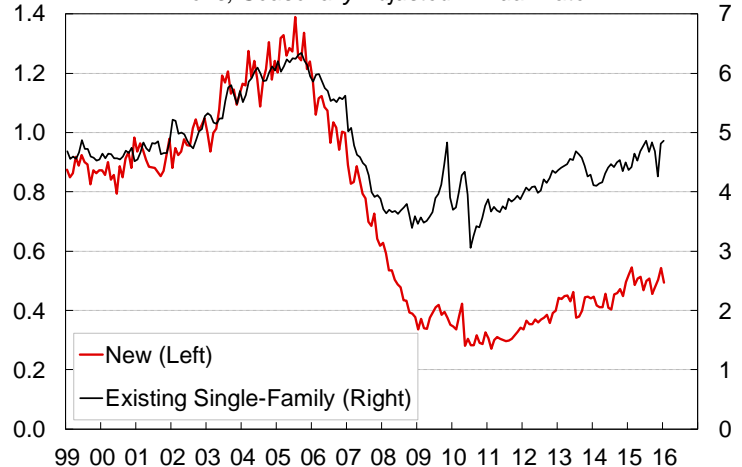
US Housing Starts & Building Permits
Millions, Seasonally Adjusted Annual Rate



US Housing Starts
Millions



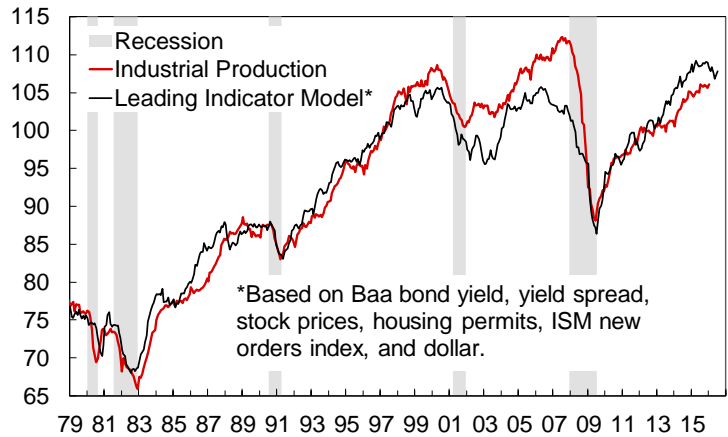
US Home Sales
Millions, Seasonally Adjusted Annual Rate



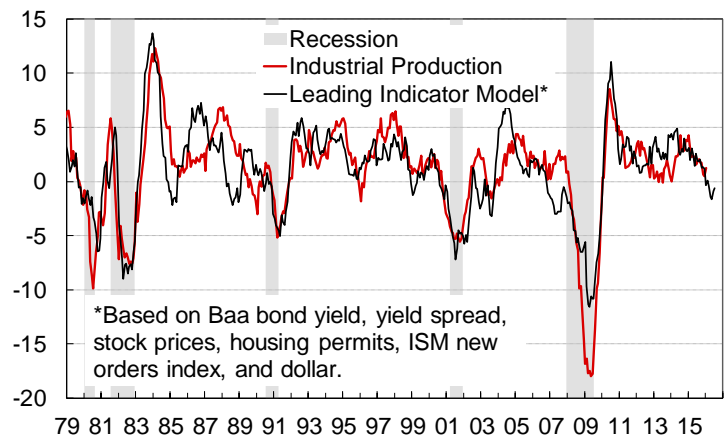
Global Macroeconomic Overview

- Industrial production in U.S. manufacturing (excluding computers, communication equipment, and semiconductors) rose in January to its highest level since June 2008.
- While my own leading indicator declined from June through December last year, it rose in January and February. The decline wasn't big enough to signal a large decline in industrial production; the small rise is not big enough to signal a significant reacceleration. U.S. manufacturing is better characterized as flat than as up or down.
- Industrial production for manufacturing (excluding the high-tech sectors) was up just 1.2% year-over-year in January.
- My leading index for industrial production suggests that year-over-year growth will remain near zero over the next few months.
- The Institute for Supply Management's PMI new orders index for manufacturing, which had fallen below the neutral level of 50 in November and December, rose to 51.5 in January and held at that level in February. The index doesn't point to strong growth in U.S. manufacturing over the next few months, but it doesn't point to declines either.

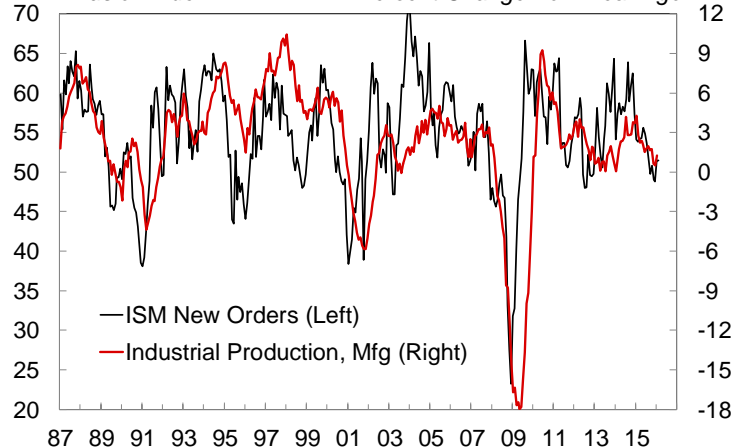
US Industrial Production: Manufacturing ex high-tech
Index 2012 = 100



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



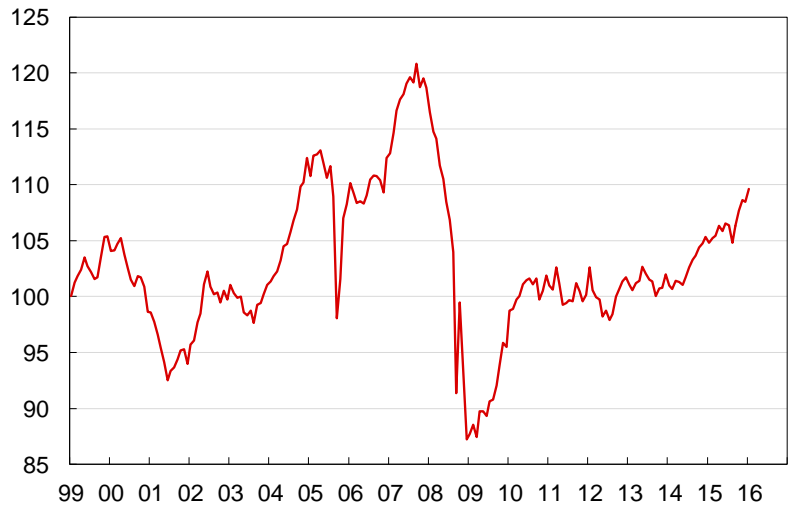
US Industrial Production vs ISM New Orders Index
Diffusion Index Percent Change from Year Ago



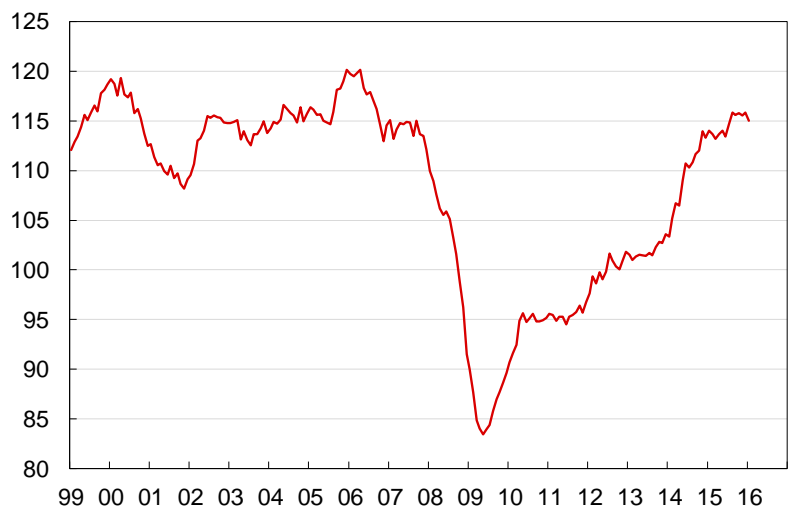
Global Macroeconomic Overview

- Industrial production for chemicals (excluding pharmaceuticals) rose in January to its highest level since May 2008 and was up 4.6% year-over-year.
- Chemical production in the United States is expanding as new facilities are built to take advantage of the abundance of cheap natural gas liquids from shale formations. Strong growth in production is likely to continue over the rest of the decade.
- U.S. industrial production of plastic and rubber products has stabilized in recent months and was up just 0.9% year-over-year in January.
- Plastic and rubber production has been boosted by both the abundance of cheap natural gas liquids and the very strong recovery in motor vehicle sales and production since the recession. The boost from cheap natural gas liquids is likely to continue. The boost from the recovery in motor vehicle sales has largely run its course.
- 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.
- The Producer Price Index for industrial chemicals has fallen sharply since the collapse in oil prices that began in mid-2014 and is likely to fall further unless oil prices rebound significantly.

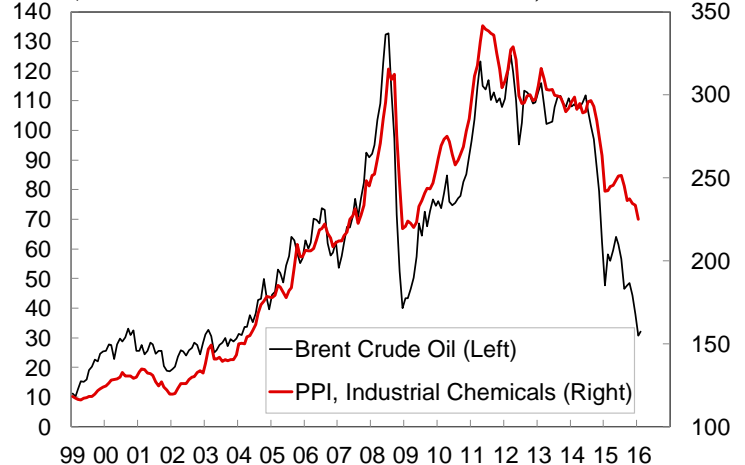
US Industrial Production: Chemicals ex pharmaceuticals
Index, 2012=100



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

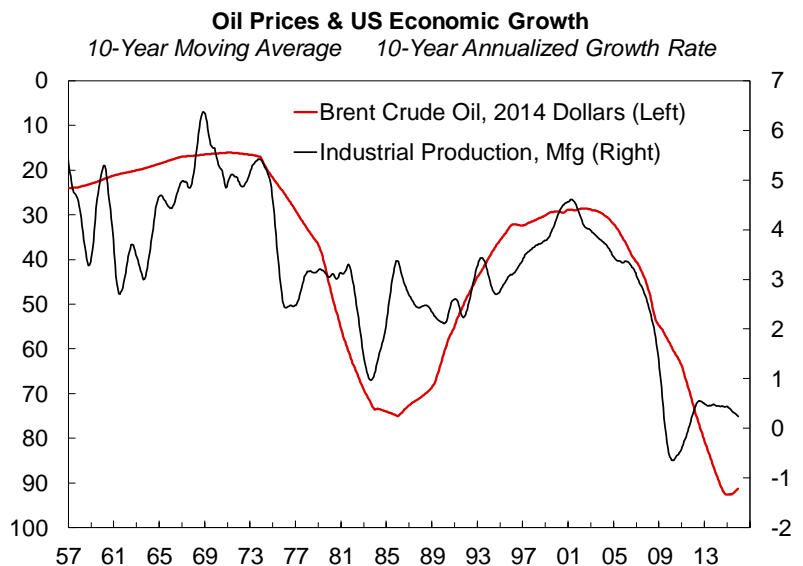
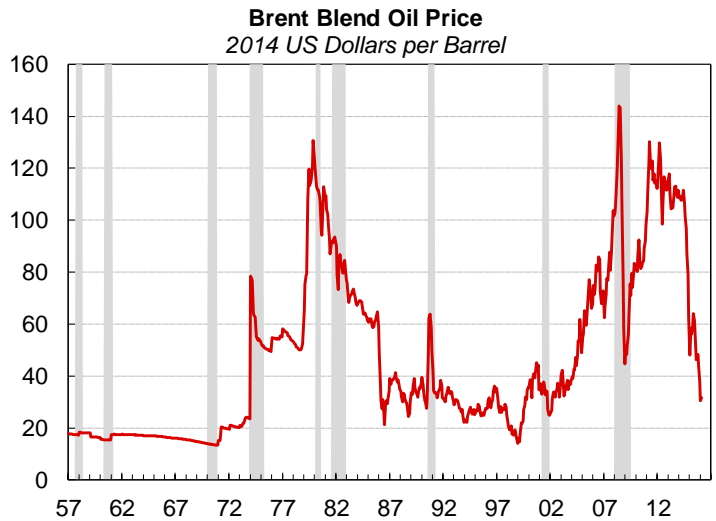
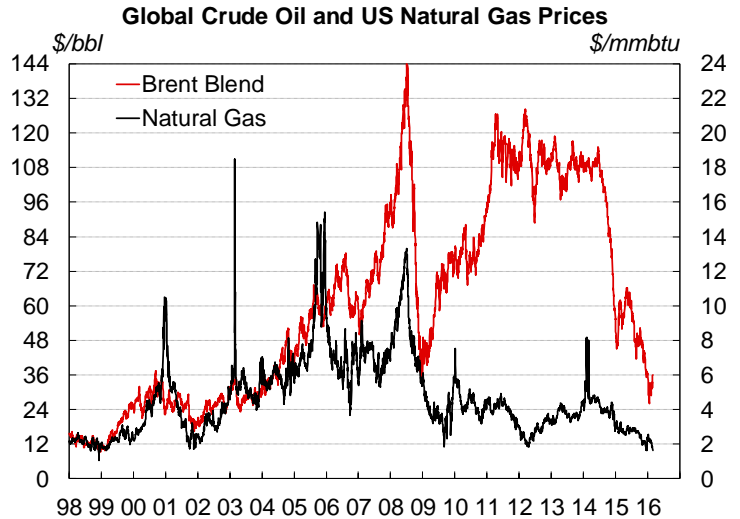


Brent Oil Price vs Industrial Chemical Prices
\$/Barrel (Left) Index, 1982 = 100 (Right)



Global Macroeconomic Overview

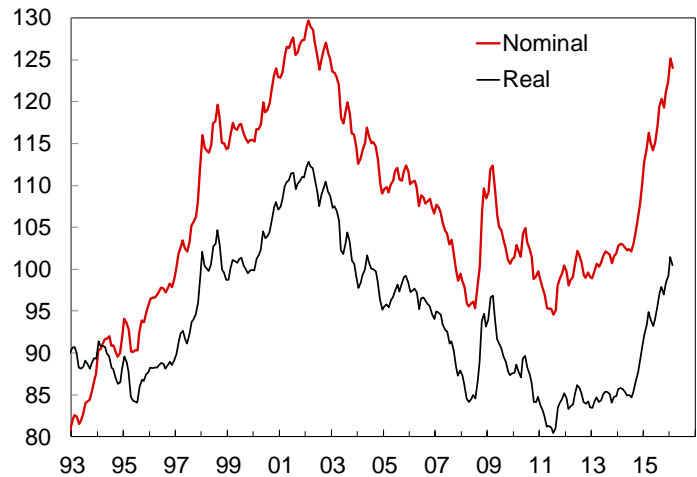
- Natural gas prices have fallen to their lowest level since 1999. Low prices for natural gas and natural gas liquids boost the competitiveness of North American chemical producers, which tend to use natural gas liquids as a feedstock while most of their foreign competitors rely on naphtha, a crude oil derivative.
- The North American chemical industry still has a significant feedstock-cost advantage. However, the decline in oil prices has lowered costs for competitors abroad, allowing for a decline in prices that has put pressure on the margins of North American chemical companies.
- Oil prices don't exhibit smooth cycles. Instead, they are marked by sudden regime shifts, shown by nearly-vertical lines on the chart.
- The real (inflation-adjusted) price of Brent Blend crude oil peaked in November 1979 and did not set another new high until May 2008. It remained above its November 1979 peak for only three months.
- Because of hydraulic fracturing and horizontal drilling in shale formations, real oil prices could remain below their 2008 highs for decades.
- Economic growth, particularly growth in U.S. industrial production in manufacturing, has been significantly stronger during periods of low real oil prices than during periods of high prices.
- Although real oil prices peaked in 2008 and have fallen sharply since mid-2014, the 10-year moving average of real oil prices did not begin to decline until 2015.



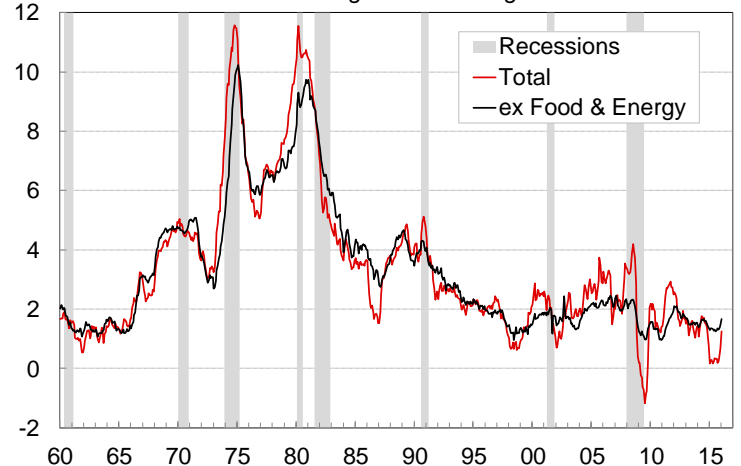
Global Macroeconomic Overview

- The sharp appreciation of the U.S. dollar last year has significantly reduced the dollar value of the foreign-currency earnings of U.S. corporations.
- A strong dollar also reduces the competitiveness of U.S.-produced goods and services. Until recently, the “real” dollar index (adjusted for inflation) was not unusually high by historical standards, suggesting that the strong dollar would not threaten the viability of U.S. companies even if it squeezed profit margins. Further appreciation, however, would pose a serious threat to U.S. competitiveness.
- The U.S. Federal Reserve seeks to keep inflation, as measured by the year-over-year change in the Personal Consumption Expenditure Price Index, near 2%.
- The total PCE Price Index, which was up just 0.2% year-over-year as recently as October 2015, was up 1.3% year-over-year in January. The “core” (ex food and energy) index was up 1.7% in January versus 1.3% in October.
- The Federal Reserve raised its target federal funds rate by a quarter point at its December meeting.
- Declines in stock prices and a string of weak economic reports in January seemed to take further rate hikes off the table for now, but January’s jump in inflation suggests the Fed must raise rates further this year. I expect two quarter-point hikes.
- A 30-year downtrend in the yield on 10-year Treasury notes likely ended in 2013, but the yield has risen little since then. Yields are likely to rise going forward, but to remain well below historical norms.

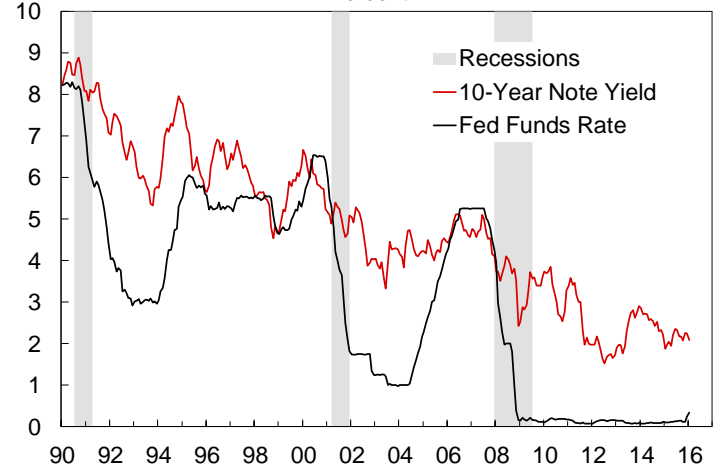
Federal Reserve Broad Dollar Index



US Personal Consumption Expenditures Price Index
Percent Change from Year Ago

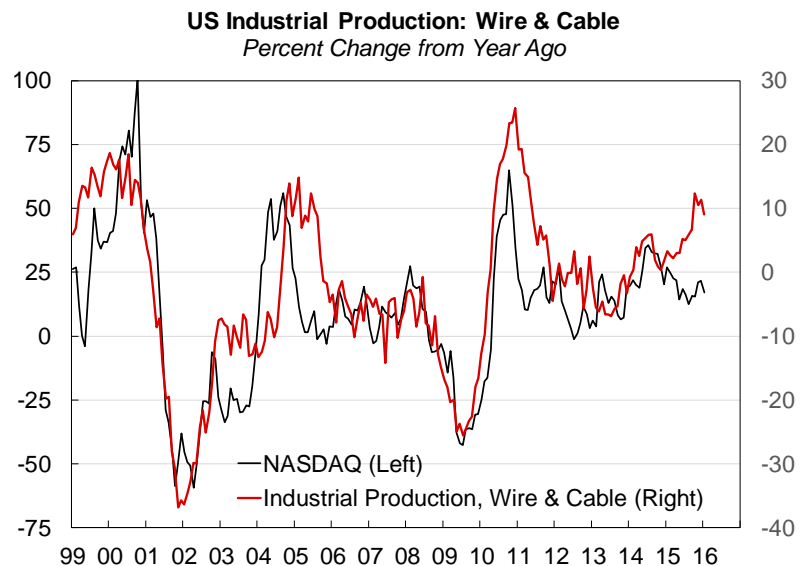
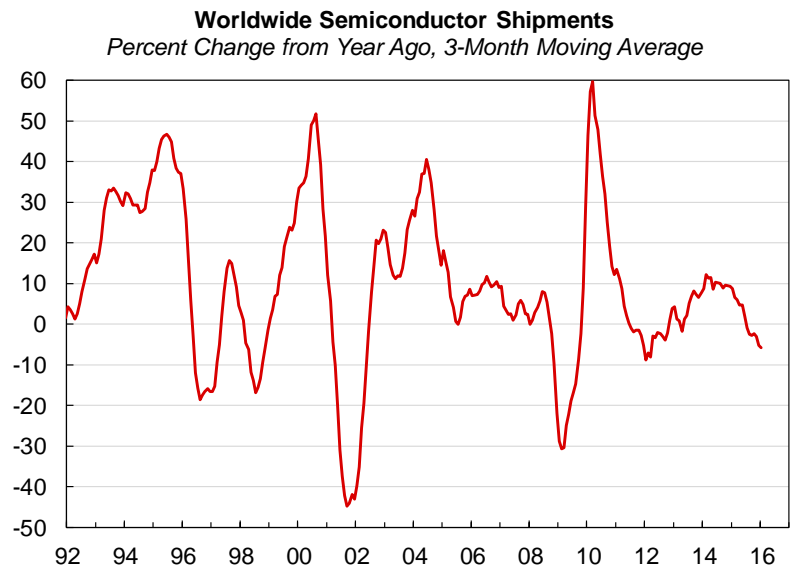
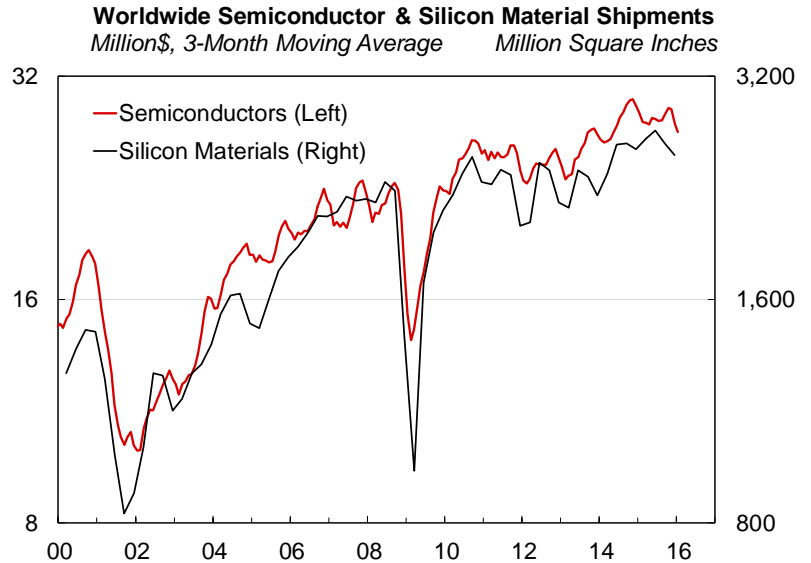


US Interest Rates
Percent



Global Macroeconomic Overview

- Shipments of silicon materials are a good indicator of global demand for products going into the electronics industry. Shipments declined in the third and fourth quarters of 2015 after hitting a record high in the second quarter. They were down 1.8% year-over-year in the fourth quarter.
- The data 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 hit a record high in the three months ending in November 2014, but have declined since then.
- Worldwide semiconductor shipments were down 5.8% year-over-year in the three months ending in January.
- Industrial production of wire and cable used in communication and energy applications rose in December to its highest level since 2008. It was up 9% year-over-year in January despite a small monthly decline.
- The decline in the NASDAQ stock price index over the last year suggests that growth in wire and cable production is likely to slow significantly.



Global GDP Growth

					Forecast				2020
	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>-2025</u>
World	2.4	2.6	2.4	2.6	3.0	3.1	3.1	3.1	3.1
North America	1.5	2.4	2.3	2.2	2.8	2.5	2.5	2.4	2.3
United States	1.5	2.4	2.4	2.3	2.8	2.5	2.5	2.5	2.3
Canada	2.0	2.4	1.2	1.7	2.1	2.3	2.1	2.0	2.2
Mexico	1.4	2.1	2.5	2.6	2.9	3.2	3.3	3.3	3.3
Western Europe	0.2	1.3	1.7	1.8	1.8	1.7	1.7	1.7	1.6
France	0.7	0.2	1.1	1.3	1.5	1.7	1.9	1.9	1.4
Germany	0.4	1.6	1.7	1.7	1.7	1.3	1.3	1.3	1.6
Italy	-1.7	-0.4	0.7	1.3	1.2	1.1	1.1	1.0	0.9
Spain	-1.2	1.4	3.2	2.7	2.3	2.0	1.9	1.8	1.7
U.K.	1.7	3.0	2.3	2.2	2.2	2.2	2.2	2.1	2.2
C & E Europe	2.2	1.8	0.2	1.6	2.6	2.8	2.8	2.8	2.9
Middle East & Africa	2.9	3.1	2.5	3.5	3.8	4.1	4.2	4.3	4.0
Asia/Pacific	4.8	4.3	4.3	4.4	4.3	4.4	4.6	4.6	4.5
Japan	1.6	-0.1	0.6	1.0	0.3	0.7	0.9	0.7	0.9
ex Japan	6.0	5.9	5.6	5.5	5.5	5.5	5.6	5.6	5.4
Australia	2.1	2.7	2.4	2.9	3.1	3.0	2.9	2.8	2.7
China	7.7	7.3	6.9	6.3	6.0	6.0	6.0	6.0	5.9
India	6.9	7.3	7.3	7.5	7.5	7.5	7.5	7.5	7.2
Indonesia	5.6	5.0	4.7	5.1	5.5	5.8	6.0	6.0	5.2
Korea (South)	2.9	3.3	2.5	3.0	3.5	3.6	3.6	3.6	2.5
Malaysia	4.7	6.0	4.7	4.5	5.0	5.0	5.0	5.0	4.9
Philippines	7.1	6.1	6.0	6.3	6.5	6.5	6.5	6.5	4.9
Singapore	4.4	2.9	2.2	2.9	3.2	3.2	3.2	3.2	3.4
Taiwan	2.2	3.8	2.2	2.6	2.9	3.1	3.1	3.2	3.0
Thailand	2.8	0.9	2.5	3.2	3.6	3.4	3.3	3.2	3.7
Vietnam	5.4	6.0	6.5	6.4	6.0	6.0	6.0	6.0	6.0
Latin America	3.1	0.9	-1.7	-1.2	1.0	2.3	2.5	2.6	2.9
Argentina	2.9	0.5	0.4	-0.7	0.0	0.1	0.2	0.2	1.8
Brazil	2.7	0.1	-3.8	-3.5	0.0	2.4	2.5	2.5	2.5
Colombia	4.9	4.6	2.5	2.8	3.2	3.6	3.9	4.1	4.0
Venezuela	1.3	-4.0	-10.0	-6.0	-4.5	-3.0	-1.0	0.0	2.6

Global Industrial Production

					Forecast				2021
	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>-2026</u>
World	3.3	1.9	1.9	2.9	2.7	2.5	2.4	2.4	2.2
Advanced economies	2.4	0.7	1.0	1.9	1.9	1.8	1.7	1.7	1.4
United States	3.7	1.3	0.4	2.3	2.5	2.5	2.4	2.3	2.0
Japan	1.9	-1.0	1.0	1.0	1.0	0.5	0.5	0.5	0.5
Euro Area	0.9	1.3	1.5	2.0	1.5	1.5	1.5	1.5	1.2
Other advanced	2.5	0.1	1.5	2.0	2.0	2.0	2.0	2.0	1.5
Emerging economies	4.2	3.0	3.3	4.4	3.9	3.8	3.5	3.5	3.4
Emerging Asia	6.3	4.7	5.5	6.0	5.0	5.0	4.5	4.5	4.0
C & E Europe	2.5	0.4	2.0	3.0	3.0	3.0	3.0	3.0	2.5
Latin America	-0.5	-2.1	0.0	3.0	3.0	2.0	2.0	2.0	2.5
Middle East & Africa	0.0	1.8	2.0	3.0	3.0	3.0	3.0	3.0	3.5

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