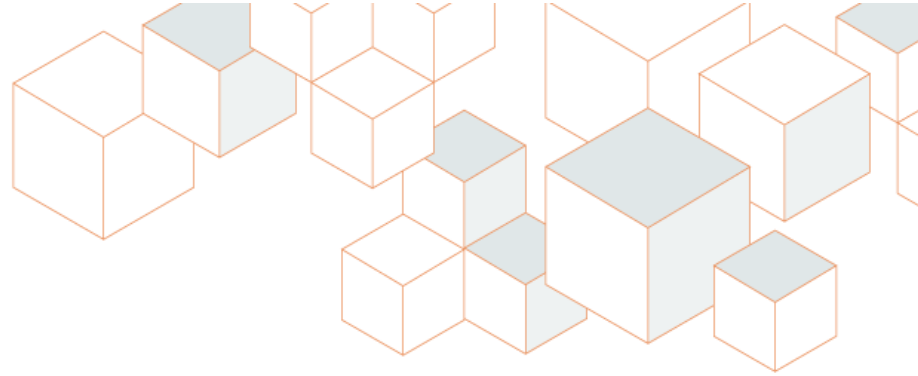


Year-End 2015 Chemical Industry Situation and Outlook

American Chemistry Accelerating Growth

December 2015





Growth in American chemistry accelerated in 2015 despite dollar appreciation, weakness in markets abroad, and a challenging first quarter. In the United States, chemistry outpaced manufacturing gains in 2015, despite weakness in exports due to lower growth in emerging markets and the high value of the dollar. Key domestic end-use markets expanded, including strong gains in light vehicles and housing. Growth in consumer spending also accelerated as the job market started to firm and households enjoyed savings from lower energy prices; and it is expected to be the strongest in a decade. Industries that supply goods and services to the oil and gas sector, however, struggled amid persistent low oil prices and subsequent collapse in investment. Export-oriented manufacturers also suffered the effects of the higher dollar and lower demand abroad, depressing trade growth to its slowest pace since the recession. Inflation remains non-existent, but the Fed is expected to begin raising interest rates before the end of the year.

Looking ahead to 2016, improvements in global markets will boost demand for American chemistry, though the higher dollar will remain a headwind for exporters. Consumer spending remains strong as further improvements in the labor market and rising confidence support growth. Vehicle sales are expected to edge higher and stronger gains in housing are expected as household formation accelerates.

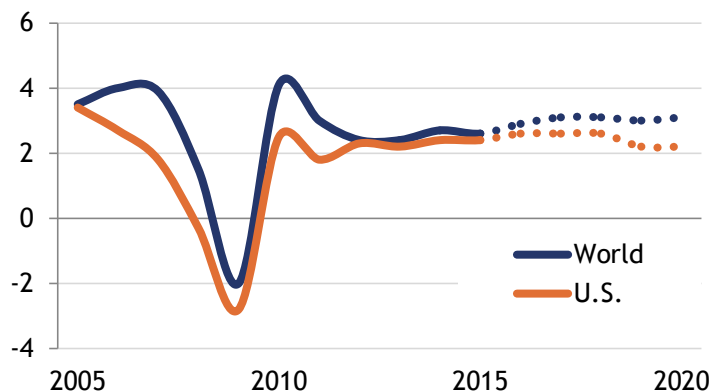
During 2015, output gains were led by consumer chemistry, synthetic rubber, bulk petrochemicals and organics, and specialties. Advances in manufacturing and exports during 2016 and beyond will continue to drive demand for basic chemicals, especially those segments in which the United States enjoys a renewed competitive advantage.

American chemistry continues to build momentum as announced investments in new chemical capacity persist. These investments will capitalize on the profound and sustainable competitive advantage enabled by shale gas development. In addition, the industry is adding high-paying American jobs after years of trimming payrolls. Chemistry companies in the U.S. continue to innovate, focusing on improving efficiencies as well as on new leading-edge product development.

U.S. and World Macroeconomic Situation & Outlook

Despite headwinds, the U.S. economy will continue to progress

World GDP (market exchange basis), Real U.S. GDP
% change Y/Y



ACC's CAB signals slow growth in the United States into 2016.

U.S. GDP growth will be in line with the underlying trend, about 2.6%. Growth is expected to moderate towards the end of the decade. Long-term growth in the economy is expected to be muted due to demographic, policy and other factors. *The U.S. chemical industry* will be a source of strength in the economic outlook as improvement in its customer industries and in emerging markets occurs and as the effects of enhanced feedstock competitiveness bolster growth.

The global economy faltered in 2015 with heightened geo-political uncertainty and recessions in Brazil, Russia, Japan and other nations, as well as a pronounced slowdown in China. That said, the economies of the United Kingdom and the Euro Area for the most part advanced, as did that of the United States. Monetary policy around the world remains accommodative and inflationary pressures are virtually non-existent given the decline in oil prices. The global manufacturing sector, which represents the primary customer base for the chemical industry, entered a soft period in 2015.

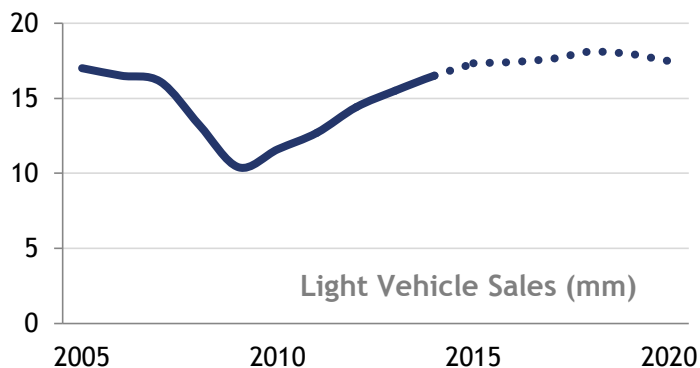
In the United States, the economy remains below its potential growth as high taxes, debt and regulatory burdens still take a toll on both business and consumer confidence. As a result, businesses have been cautious and capital spending has been slow in 2015. Furthermore, overseas weakness and a higher dollar dampened U.S. exports. That said, consumers are starting to spend again thanks to further improvements in the employment situation, the boost in discretionary incomes from lower oil prices, and higher asset prices.

Overall, growth in the U.S. economy will continue into 2016 and we can see this by examining the trends in **ACC's Chemical Activity Barometer (CAB)**. The CAB is a composite index of economic indicators that track the activity of the chemical industry. Due to its early position in the supply chain, chemical industry activity leads activity in the overall economy and thus, the CAB can be used to anticipate potential turning points in the overall economy. The CAB currently signals slow economic growth into 2016. Indeed, the consensus forecast for U.S. GDP is for continued, but modest, growth of 2.6% in 2016. This is close to trend growth, but the pace will likely ease slightly in 2018 and beyond as cyclical factors increase the likelihood of slower growth. As of December, the current recovery and expansion is 78 months old; the average for post-World War II upturns is 60 months. So the current upturn is getting a little old. Using a baseball metaphor, we are in the seventh inning. Long-term growth in the economy will be more muted due to demographic, policy and other factors.

End-Use Markets

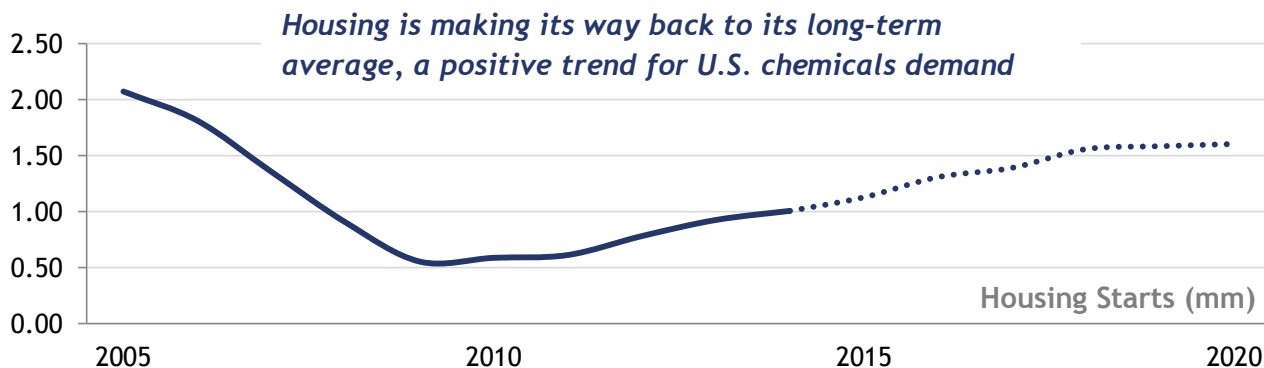
Gains in key end-use markets continue to be driven by vehicles and housing.

Many key end-use markets for chemistry expanded in 2015; however, industries tied to oil and gas investment and export markets struggled. Leaders included light vehicles, appliances, construction materials, and some industries involved with business investment. Elsewhere, several manufacturing industries have yet to regain traction (textiles, paper, printing, etc.) where structural changes and competitive disadvantages persist. The high value of the dollar will continue to be a headwind for export-oriented customers, although this will be offset by higher domestic demand as consumer spending remains strong and housing activity accelerates.



Light vehicles represent an important market for chemistry – nearly \$3,500 in chemistry per vehicle – and production continues to improve. U.S. light vehicle sales are expected to edge higher in 2016 as job growth continues, incomes rise and credit becomes increasingly available.

Housing is another large consumer of chemistry (about \$15,000 in chemistry per start) and the outlook is for continued slow expansion. Low interest rates, better labor market conditions and an upturn in household formations supported housing gains in 2015. Housing was further supported by strong job growth and rising incomes. However, low inventories in many markets and continued price gains are a challenge for some first-time homebuyers, many of whom are entering the market with large amounts of student debt. Continued gains in housing starts are expected in 2016 and 2017. Housing starts will approach the long-term underlying demand of 1.5 million units per year based on population growth and replacement rates for older properties. Spending on home improvements is also expected to remain strong.



U.S. and World Chemistry Situation & Outlook

Moving Forward

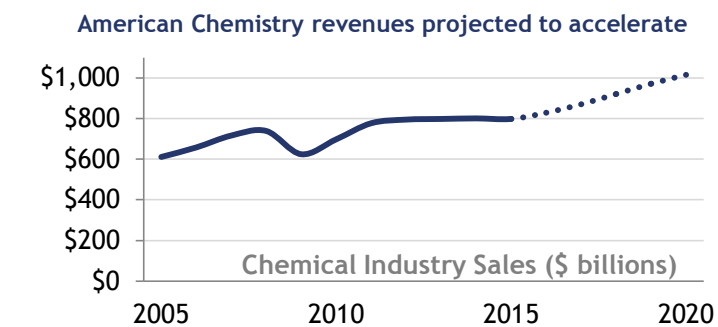
Despite the slowdown in manufacturing, U.S. chemistry volume gains have improved. Even with the fall in oil prices, the U.S. industry still has a favorable competitive position with regard to feedstock costs as natural gas prices have fallen as well. This will support U.S. chemical industry production going forward.

For the business of chemistry in the United States, weakness in manufacturing dampened domestic chemical demand and weakness abroad has hindered export sales although chemical exports would normally be aided by a favorable oil-to-gas price ratio. That said, U.S. exporters of plastic resins have done very well this year. This is a preview of the long term, as ACC expects trade in chemicals will continue to expand when global manufacturing activity improves and as U.S. capacity for organic chemicals, plastic resins and other downstream products comes on-stream. Trade deficits will continue to be centered in pharmaceuticals and agricultural chemicals which are partially offset by large (and growing) surpluses in basic and specialty chemicals.

The consensus is that U.S. chemical output will improve during 2016 and the second half of the decade. As a result, following the 3.6% gain during 2015, chemical production will rise 2.9% in 2016 and then surge through 2020. Strong growth is expected in inorganic chemicals, organic chemistry, plastic resins and synthetic rubber as export markets revive and domestic end-use markets further improve. Production of specialty chemicals was driven by strong demand from end-use markets into late-2014 but the collapse of drilling activity adversely affected oilfield chemical demand and the weakness in manufacturing fostered soft activity in other segments. As a result, demand has been weak with exports taking up some of the slack. In the long term, production will improve as the manufacturing renaissance gains traction.

Strong 2015 gains in consumer products will moderate in 2016 and 2017. Demand for agricultural chemicals (and their supply from the U.S.) will revive. During the second half of the decade, U.S. chemistry growth is expected to expand at a pace (over 4% per year on average) exceeding that of the overall U.S. economy. Aided by an aging population, pharmaceuticals will eventually emerge as a growth segment in towards the end of the decade.

In the U.S., chemical production continued to grow across all regions during 2015. The highest growth was seen in the Northeast, Mid-Atlantic, and Ohio Valley regions, reflecting strong gains in certain specialties and consumer chemistry produced in those regions. Production will continue to expand in 2016 and into 2017. As the surge of shale-driven chemical capacity starts to come online in 2017 and beyond, growth will accelerate, especially along the Gulf Coast. By 2020, American chemistry revenues will exceed \$1.0 trillion.

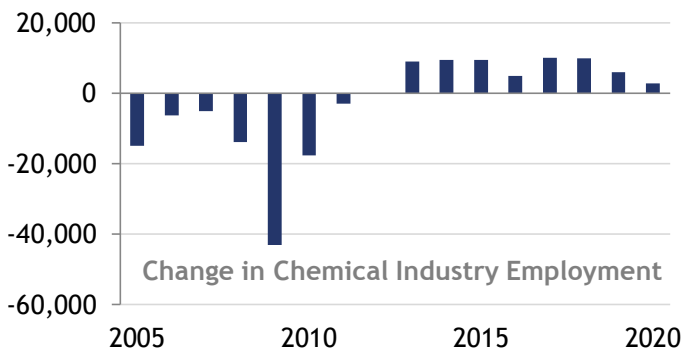


\$1 TRILLION
In U.S. chemical industry sales by 2020

U.S. chemical output is expected to rise 2.9% in 2016 and 4.4% in 2017.

IN THE LONG-TERM,
the U.S. chemical industry will grow faster than the overall U.S. economy.

Job Growth Continues



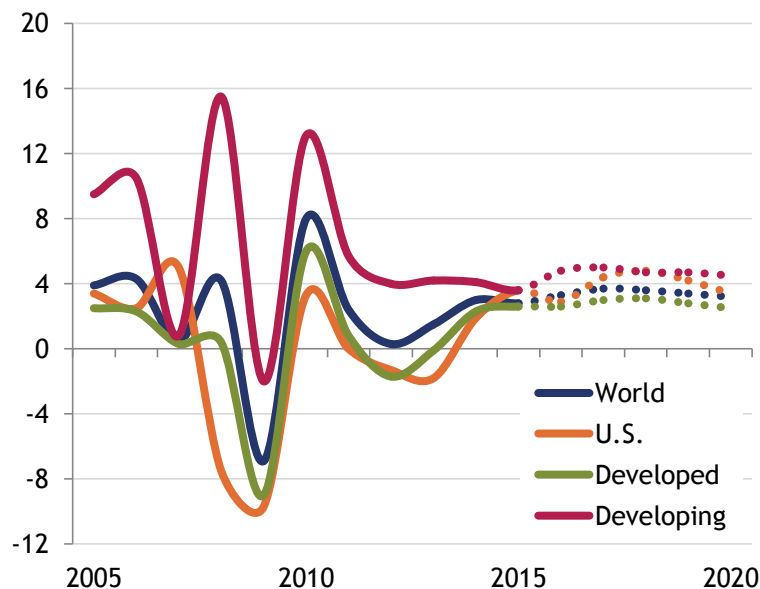
Chemical industry adding jobs

Chemical industry expansion over the past few years has reversed the trend of continuous job losses from 1999-2011. Employment in the chemical industry is expected to have grown by 1.2% in 2015. Continued steady job gains are expected through 2020, especially as new capacity comes online. Because chemical industry workers are among the highest paid in the manufacturing sector, growing payrolls will strengthen local economies.

Global chemistry set to re-engage and expand

In global chemistry, a recession in many emerging markets, especially the slowdown in China, clearly affected volumes. After much promise at the start of the year, overall global production likely advanced only 2.8% in 2015, slightly slower than the 3.0% pace in 2014. Economic prospects will improve during 2016, with global chemistry output rising 3.3% and then gathering momentum to 3.7% in 2017. In the long term, the most dynamic achievements will be found in the developing nations of Asia-Pacific and Africa & the Middle East. But due to competitive advantages from shale gas, growth will be strong in North America as well. With long-term structural and competitiveness challenges at work, Western Europe and Japan will lag. The slower growth in Latin America and some other emerging markets, however, is more short-term in nature. With strengthening production volumes, global capacity utilization will improve in the years to come.

Global Business of Chemistry Output % change Y/Y



Strong Y/Y gains in chemicals output growth in the developing nations of Asia-Pacific and Africa & the Middle East but the United States re-captures global market share in the long-term.

Capital/Infrastructure

The United States is still the location for chemical investment

We need tax policies that will drive innovation, increase productivity and promote manufacturing competitiveness in the U.S.

Over 255 new chemical production projects (valued at over \$158 billion altogether) have been announced and the dynamics for sustained capital investment are in place.

Average annual gains of over 7% per year in U.S. capital spending are expected through 2018 with only a minor slowdown in growth after that.

A capital spending cycle began in 2010 as chemical manufacturers recovered from the Great Recession. Initially, this cycle was sustaining capital that drove investment in the U.S. with expenditures allocated towards equipment upgrades and other efficiency investments. Access to vast, new supplies of natural gas, however, has created an enormous competitive advantage for American chemistry -- petrochemical manufacturers in particular. The trend in capital investment has rapidly accelerated and changed, driven by significant expansion of existing petrochemical capacity. As a result, capital spending during 2014 increased 12.1% to \$33.43 billion. Despite the hindrance of slow global growth, uncertainty and U.S. tax policies that discourage business investment, these strong gains in capital spending for American chemistry are expected to continue. Capital spending likely surged 18.4% during 2015 and is expected to increase more than 7% per year on average through 2018 with only a minor slowdown in growth after that. Expansions will continue and investments to improve operating efficiencies will play a role as well. By 2020, annual U.S. capital spending by the chemical industry will reach \$55.3 billion - double the level of spending at the start of this prolonged cycle in 2009.

With healthy profit margins, a low cost of capital, and the opportunities afforded by shale gas, prodigious increases in new plant and equipment investment in the United States are forthcoming. The U.S. is the investment location for chemical companies who are announcing significant expansions of capacity. It is estimated that the gains to basic olefins capacity will range from 35% to 40%. Indeed, over 255 new chemical production projects (valued at over \$158 billion altogether) have been announced through early December and the dynamics for sustained capital investment are in place.

Access to plentiful and affordable natural gas supplies is allowing the United States to capture an increasing share of global chemical industry investment. This trend will continue as the United States has become the location for investment. By 2020, global chemical industry capital investment will reach \$608 billion, a level more than two times higher than it was in 2009.

\$55 BILLION

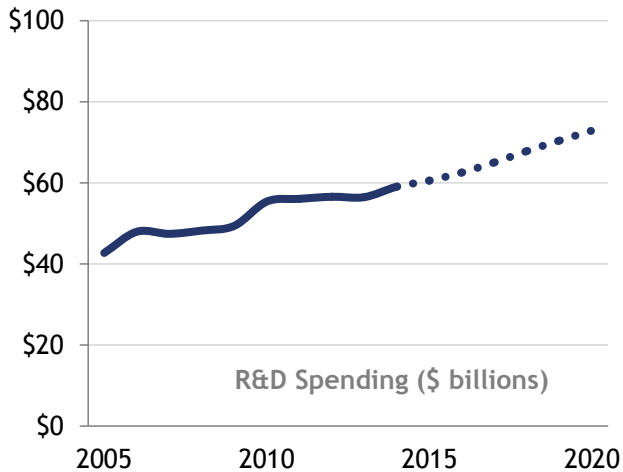
In U.S. Chemical Industry
Capital Spending by 2020

\$608 BILLION

In Global Chemical Industry
Capital Spending by 2020

Innovation

The chemical industry is one of the top private investors in R&D



Chemistry is a science and technology, knowledge-based endeavor. In 2014, the business of chemistry invested \$59.1 billion in research and development (R&D). With improved margins and prospects it is likely that R&D spending increased 2.5% to \$60.6 billion in 2015.

Companies continue to focus on improving efficiencies as well as on leading-edge product innovations and are strengthening R&D activities. Looking forward, R&D spending is expected to increase 3.3% to \$62.6 billion in 2016. Improving gains are expected thereafter and by 2020, R&D spending will reach \$72.9 billion.

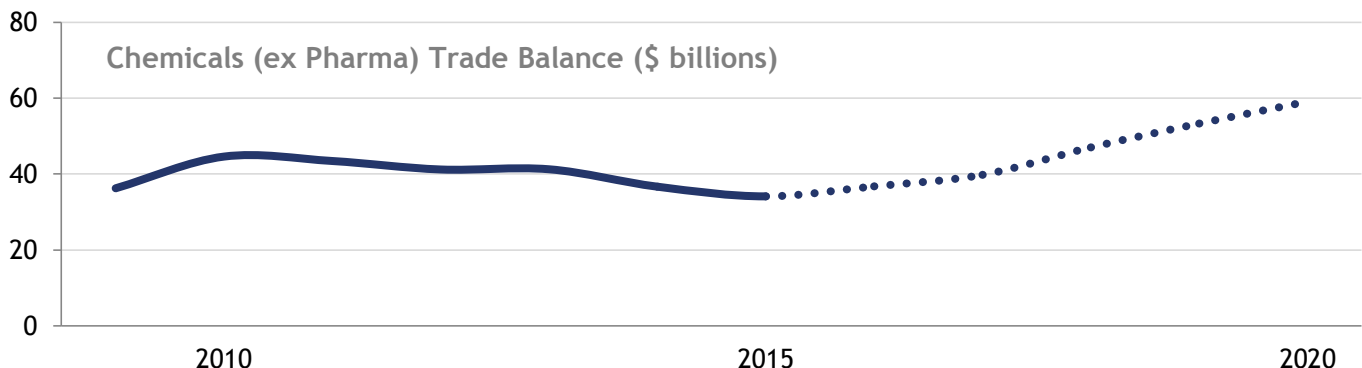
Pharmaceutical R&D spending gains will continue to outpace non-pharmaceutical segments although the latter will enjoy new buoyancy. Computational advances and other innovations are resulting in improved R&D effectiveness.

Trade

Competitive advantage from shale and new investments will boost U.S. chemicals exports

Despite slower growth in American manufacturing, improvement in labor markets and growth in key end-use markets have translated to solid domestic demand for chemicals. Weak export markets and a strong dollar, however, curbed demand for U.S. chemistry exports. Despite higher oil prices, which have eroded somewhat, the U.S. remains a global low-cost producer of many petrochemicals and derivatives. With new capacity coming online over the next several years, the U.S. trade position is set to improve, especially in methanol-, ethylene-, and propylene-based chemistries.

Excluding pharmaceuticals (in which the U.S. routinely posts large trade deficits), the U.S. is a net exporter of chemicals. By this measure, the industry will post a trade surplus of \$34 billion this year reflecting a \$30 billion surplus in basic chemicals. As new investments in the chemical industry come online, basic chemicals export growth will accelerate. **The surplus in chemicals trade, excluding pharmaceuticals, will grow to \$59.1 billion by 2020.**



Conclusion

As we enter 2016, the business of chemistry is building momentum. A recovery in end-use markets, continued favorable competitiveness, and the eventual return of global economic growth will lift demand for American chemistry over the next several years. ACC expects to see above-trend growth in basic chemicals over the forecast horizon, in addition to solid demand in other segments.

Innovation will continue to drive American chemistry, with growing investments in research and development in new applications and more efficient processing techniques. Research in the safety of chemical products also continues to be a significant part of companies' research programs.

With the development of shale gas and the surge in natural gas liquids supply, the United States has moved from being a high-cost producer of key petrochemicals and resins to among the lowest-cost producers globally. This shift in competitiveness is boosting export demand and driving significant flows of new capital investment toward the United States. Recently announced new capacity for chemicals will significantly expand production in basic chemicals when those investments come online, which has already begun. In addition, despite the current weakness in manufacturing, a tipping point in downstream customer industries points is being reached and will lead to strong domestic demand, which aids specialties.

As a result, employment in the business of chemistry will pick up. The industry is expected to add high-paying jobs through the end of the decade. U.S. chemical exports will grow and, as external demand becomes more robust, the net surplus in chemicals (excluding pharmaceuticals) will continue to expand. The "manufacturing renaissance" is still very much in play.

TABLE 1
Macroeconomic Outlook

% Change Year-over-Year unless otherwise noted	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average 2021-25
Global Macroeconomic Indicators										
GDP (Market Exchange Rate basis)	2.4	2.4	2.7	2.6	2.9	3.1	3.1	3.0	3.1	2.7
World Trade	2.9	3.3	3.3	2.3	4.2	4.7	5.0	4.9	4.8	4.7
Industrial Production	2.8	2.4	3.3	1.7	3.1	3.3	3.2	3.1	3.1	2.9
Consumer Prices	4.2	3.9	3.5	3.1	3.4	3.7	3.4	3.3	3.1	3.1
U.S. Macroeconomic Indicators										
GDP	2.2	1.5	2.4	2.4	2.6	2.6	2.6	2.2	2.2	2.3
Consumer Spending	1.5	1.7	2.7	3.2	3.0	2.5	2.5	2.1	2.1	2.2
Business Investment	9.0	3.0	6.2	3.4	4.3	5.0	4.9	4.2	3.9	3.1
Industrial Production	2.8	1.9	3.7	1.5	2.0	3.3	3.2	2.7	2.5	2.6
Light Vehicle Sales (mm)	14.4	15.5	16.5	17.3	17.4	17.5	18.2	18.0	17.5	17.3
Housing Starts (mm)	0.78	0.93	1.01	1.13	1.31	1.39	1.54	1.58	1.60	1.60
Consumer Prices	2.1	1.5	1.6	0.1	1.6	2.2	2.3	2.2	2.2	2.1
10-Year Treasury Notes (%)	1.80	2.35	2.54	2.38	2.74	3.13	3.53	3.81	3.80	4.15
Unemployment Rate (%)	8.1	7.4	6.2	5.3	4.9	4.8	4.9	4.9	5.0	5.0
Exchange Rate (\$U.S./euro)	1.29	1.33	1.33	1.10	1.07	1.12	1.19	1.23	1.26	1.29
U.S. End-Use Market Output										
Construction	4.6	4.2	4.3	5.3	7.9	6.2	4.8	3.5	3.3	4.0
Food, Beverages & Tobacco	3.6	1.2	1.8	1.2	1.3	2.7	2.3	1.8	1.5	1.2
Textile Mill Products	0.4	-0.9	1.5	0.2	-0.6	-0.8	-1.4	-1.9	-2.2	-2.4
Apparel	-3.7	2.8	1.2	0.2	-1.3	-1.3	-1.8	-2.8	-2.8	-2.6
Structural Panels	4.9	9.9	4.2	2.7	5.4	6.1	3.6	2.2	2.6	1.6
Paper	-2.2	-0.5	-2.5	-1.1	-0.3	1.0	1.0	0.9	0.8	0.6
Printing	-2.4	-0.6	2.3	0.9	-0.3	-0.1	-0.3	-0.4	-0.4	-0.3
Petroleum Refining	0.4	2.6	3.4	1.6	2.5	2.4	1.8	1.3	0.8	0.5
Rubber & Plastic Products	3.5	4.6	7.0	4.7	2.9	4.6	4.7	3.7	2.7	2.4
Iron & Steel	3.7	-1.0	2.4	-8.9	1.7	2.9	2.7	1.9	1.7	1.1
Fabricated Metal Products	7.2	3.5	4.2	1.5	2.1	3.2	3.0	2.7	2.6	2.4
Computers	10.6	6.9	4.5	1.5	2.5	4.8	3.9	3.6	3.5	3.4
Semiconductors & Electronic Components	18.0	11.7	8.2	-1.8	4.9	10.6	8.2	6.6	6.0	5.6
Appliances	-0.8	7.8	5.7	4.5	3.1	3.5	2.6	1.8	1.6	1.6
Motor Vehicles & Parts	14.8	7.8	8.1	8.7	4.9	2.5	1.3	0.6	0.1	2.1
Aerospace	7.7	1.3	2.2	2.1	4.2	6.4	5.8	4.9	4.7	4.3
Furniture	2.8	3.3	7.1	3.5	2.0	4.2	3.0	2.2	1.9	1.7

TABLE 2
U.S. Chemistry Outlook: Production Volumes

% Change Year-over-Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average 2021-25
Total Chemicals Production Volume	-1.3	-1.8	1.9	3.6	2.9	4.4	4.8	4.2	3.4	2.9
Production Volume by Segment										
Pharmaceuticals	-3.3	-7.5	2.6	3.2	2.6	3.7	3.9	3.4	3.3	3.3
Chemicals, excl. Pharmaceuticals	-0.1	1.6	1.4	3.8	3.1	4.7	5.3	4.6	3.4	2.6
Agricultural Chemicals	2.9	7.9	0.6	-1.8	2.2	6.4	6.7	4.4	2.6	1.8
Fertilizers	8.4	11.3	-6.6	-0.8	2.0	7.2	9.3	6.6	4.3	2.7
Crop Protection	23.3	20.6	1.0	-2.4	2.4	5.8	4.9	2.8	1.4	1.1
Consumer Products	-10.8	-0.9	4.2	7.8	2.0	2.5	2.4	2.3	2.3	2.3
Basic Chemicals	3.2	1.0	-0.2	3.2	3.6	5.5	6.7	5.9	4.1	2.7
Inorganic Chemicals	5.0	-4.1	0.5	3.2	2.7	3.5	3.3	2.9	2.5	2.2
Bulk Petrochemicals & Organics	2.1	3.7	-0.3	3.3	3.9	6.5	8.2	7.1	4.7	3.1
Plastic Resins	5.5	-0.8	-1.5	3.1	3.9	6.0	7.8	7.3	4.8	2.9
Synthetic Rubber	1.5	-3.0	6.6	5.4	3.9	5.0	5.4	4.6	3.4	2.4
Man-Made Fibers	-3.5	3.6	-0.4	0.2	0.7	1.7	3.2	2.6	0.9	-0.2
Specialties	-2.7	-1.1	6.8	3.1	3.5	4.1	3.9	3.5	3.1	2.9
Coatings	1.0	8.2	5.9	1.1	3.3	3.8	3.6	3.4	2.7	3.0
Other Specialties	-4.2	-5.2	7.3	4.1	3.5	4.2	4.0	3.5	3.2	2.8
Production Volume by Region										
Gulf Coast	2.7	1.5	0.0	3.1	3.3	5.2	6.2	5.4	3.8	2.7
Midwest	-1.5	-2.7	2.0	3.4	2.9	4.2	4.7	4.1	3.4	2.9
Ohio Valley	-0.3	1.1	1.5	3.6	3.0	4.5	5.1	4.5	3.4	2.6
Mid-Atlantic	-2.7	-4.1	2.4	3.6	2.7	4.0	4.3	3.8	3.3	3.0
Southeast	-0.9	-1.2	1.4	3.2	2.8	4.4	4.8	4.1	3.3	2.8
Northeast	-3.7	-4.5	3.0	4.0	2.7	3.8	4.0	3.5	3.2	3.0
West Coast	-2.7	-4.3	2.6	3.4	2.7	3.9	4.1	3.6	3.2	3.0
Capacity	1.7	1.9	-0.9	0.3	2.8	4.0	4.5	4.8	4.3	3.3
Capacity Utilization (%)	72.9%	70.3%	72.2%	74.6%	74.6%	74.9%	75.1%	74.6%	74.0%	74.9%

TABLE 3
U.S. Chemistry Outlook: Trade

	2012	2013	2014	2015	2016	2017	2018	2019	2020
Exports (billions)	\$188.3	\$189.1	\$191.3	\$185.9	\$195.9	\$207.4	\$221.2	\$235.0	\$248.9
Imports (billions)	\$187.5	\$185.7	\$196.6	\$206.6	\$217.0	\$227.2	\$235.1	\$243.9	\$253.4
Trade Balance (billions)	\$0.8	\$3.4	-\$5.2	-\$20.7	-\$21.1	-\$19.9	-\$13.9	-\$8.9	-\$4.4
Pharmaceuticals	-\$40.4	-\$37.9	-\$41.9	-\$54.8	-\$57.9	-\$59.7	-\$61.0	-\$62.2	-\$63.5
Chemicals, excluding Pharma.	\$41.2	\$41.3	\$36.7	\$34.1	\$36.8	\$39.8	\$47.0	\$53.3	\$59.1
Consumer Products	\$2.3	\$2.1	\$1.9	\$1.7	\$1.8	\$2.1	\$2.4	\$2.8	\$3.3
Agricultural Chemicals	-\$5.0	-\$4.0	-\$3.7	-\$4.3	-\$4.2	-\$4.2	-\$4.1	-\$4.1	-\$4.0
Specialties	\$10.3	\$9.2	\$7.4	\$7.0	\$7.3	\$7.5	\$8.3	\$9.0	\$9.7
Basic Chemicals	\$33.5	\$34.0	\$31.1	\$29.7	\$31.9	\$34.4	\$40.4	\$45.6	\$50.1

TABLE 4
U.S. Chemistry Outlook: Other Indicators

	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average 2021-25
Shipments (billions)	\$794.7	\$797.8	\$800.6	\$798.0	\$828.5	\$870.0	\$920.5	\$971.0	\$1,015.0	n/a
% Change Year-over-Year	2.3	0.4	0.3	-0.3	3.8	5.0	5.8	5.5	4.5	n/a
R&D Spending (billions)	\$56.59	\$56.49	\$59.09	\$60.58	\$62.58	\$65.08	\$67.88	\$70.45	\$72.93	n/a
% Change Year-over-Year	0.9	-0.2	4.6	2.5	3.3	4.0	4.3	3.8	3.5	n/a
Capital Spending (billions)	\$28.66	\$29.82	\$33.44	\$39.58	\$42.53	\$45.93	\$49.15	\$52.25	\$55.28	n/a
% Change Year-over-Year	11.3	4.0	12.1	18.4	7.5	8.0	7.0	6.3	5.8	n/a
Employment (thousands)	783.6	792.6	802.0	811.5	816.4	826.4	836.3	842.3	845.1	n/a
% Change Year-over-Year	0.0	1.2	1.2	1.2	0.6	1.2	1.2	0.7	0.3	n/a
Hourly Wages (\$/hour)	\$21.43	\$21.36	\$21.52	\$21.80	\$22.42	\$23.04	\$23.56	\$24.09	\$24.63	n/a
% Change Year-over-Year	-0.2	-0.3	0.7	1.3	2.9	2.8	2.3	2.2	2.2	n/a

TABLE 5
Global Business of Chemistry Production Outlook by Country and Region

% Change Year-over-Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average 2021-25
United States	-1.3	-1.8	1.9	3.6	2.9	4.4	4.8	4.2	3.4	2.9
Canada	1.1	1.3	1.6	5.9	1.9	3.3	2.9	2.8	2.6	2.5
Mexico	-0.8	0.4	-0.2	0.8	5.7	3.5	3.5	3.4	3.4	3.5
North America	-1.0	-1.5	1.2	3.5	3.0	4.2	4.6	4.0	3.3	2.9
Brazil	0.9	3.3	-0.9	-4.4	0.8	2.9	2.6	2.6	2.9	2.3
Other Latin America	-0.4	-2.8	-0.1	0.2	3.0	3.8	3.7	3.6	3.7	3.2
Latin America	0.2	0.2	-0.5	-2.1	1.9	3.3	3.2	3.1	3.3	2.7
France	0.2	2.1	1.9	3.4	2.1	2.3	2.4	2.3	2.1	1.9
Germany	-3.0	1.9	1.7	1.3	2.3	1.8	1.5	1.6	1.6	1.5
Italy	-3.0	0.7	1.1	2.5	0.8	1.4	1.3	1.1	1.0	1.1
United Kingdom	-3.4	-2.1	-0.3	2.1	1.6	1.5	1.6	1.5	1.8	1.8
Belgium	-4.3	9.1	7.0	-0.3	2.9	2.6	2.5	2.4	2.4	2.1
Ireland	-5.5	-7.7	33.4	13.8	2.9	2.2	2.3	2.2	2.3	2.9
Netherlands	3.7	-2.7	1.7	0.8	1.9	1.6	1.5	1.5	1.6	1.5
Spain	-3.9	-1.0	2.1	3.2	2.7	3.0	2.9	2.4	2.4	1.9
Sweden	2.9	0.3	-2.5	-3.2	2.3	3.0	2.9	2.7	2.6	2.5
Switzerland	4.8	-1.2	-0.8	1.1	2.4	3.1	3.2	3.2	3.2	2.9
Other	-1.2	-0.4	2.0	1.6	1.8	2.1	2.1	2.0	1.9	1.9
Western Europe	-1.8	0.4	3.0	2.4	2.0	2.0	2.0	1.9	1.9	1.8
Russia	-9.3	-1.2	-4.7	7.5	2.2	3.1	3.9	3.4	3.6	3.8
Other Central/Eastern Europe	3.4	-1.3	2.7	2.0	3.9	4.3	4.1	3.6	3.5	3.6
Central/Eastern Europe	-3.2	-1.3	-1.0	4.7	3.1	3.7	4.0	3.5	3.6	3.7
Africa & Middle East	2.9	3.3	4.2	4.1	3.7	4.4	3.7	3.6	3.6	3.8
Japan	-3.2	2.0	3.5	-1.1	1.6	1.7	1.3	1.2	1.1	0.9
Asia-Pacific excluding Japan	5.7	5.8	5.7	4.6	5.8	5.6	5.2	5.3	5.0	4.8
China	9.3	7.4	8.6	6.5	7.0	6.6	6.1	6.3	5.8	5.6
India	1.4	7.9	1.6	4.9	6.7	6.8	6.7	6.4	7.0	6.7
Australia	-0.7	0.7	0.4	2.1	2.2	2.2	2.0	2.0	2.2	1.9
South Korea	3.6	3.9	1.7	0.5	3.3	3.4	3.0	2.9	2.5	2.5
Singapore	-3.3	1.4	6.1	-1.1	3.4	3.8	3.9	4.3	3.9	3.7
Taiwan	-3.0	1.2	3.2	0.4	3.1	2.9	2.9	2.8	2.4	2.3
Other Asia/Pacific	6.6	4.1	2.4	5.9	5.5	5.2	4.9	4.9	4.7	4.7
Asia/Pacific	3.4	4.9	5.2	3.3	4.8	4.6	4.3	4.3	4.0	3.9
Total World	0.3	1.5	3.0	2.8	3.3	3.7	3.6	3.4	3.2	3.0
Developed	-1.7	-0.1	2.3	2.6	2.6	3.0	3.1	2.8	2.5	2.3
Developing	4.0	4.2	4.1	3.6	4.8	5.0	4.7	4.7	4.5	4.3

TABLE 6
Global Business of Chemistry Production Outlook by Segment

% Change Year-over-Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average 2021-25
Total Chemicals	0.3	1.5	3.0	2.8	3.3	3.7	3.6	3.4	3.2	3.0
Pharmaceuticals	-0.1	0.2	4.8	3.3	3.5	3.8	3.8	3.7	3.5	3.5
Chemicals, excl. Pharmaceuticals	0.5	1.8	2.5	2.7	3.2	3.6	3.6	3.3	3.1	2.8
Agricultural Chemicals	7.3	3.2	-0.4	3.3	2.5	3.0	2.9	2.8	2.6	2.6
Consumer Products	-3.3	1.4	3.5	0.9	2.7	3.7	3.3	2.8	2.4	2.3
Basic Chemicals	0.7	2.1	2.2	2.4	3.2	3.6	3.6	3.4	3.1	2.7
Inorganics	2.4	0.7	2.5	2.6	3.5	3.5	3.3	3.1	2.8	2.9
Bulk Petrochemicals & Organics	-1.8	1.1	0.4	2.1	3.6	3.8	3.9	3.7	3.5	2.8
Plastic Resins	2.6	3.5	4.6	3.0	3.1	3.9	4.1	3.8	3.3	3.1
Synthetic Rubber	2.8	3.6	1.4	3.4	3.3	3.2	3.3	3.3	2.8	2.9
Man-Made Fibers	3.7	4.2	2.0	4.1	3.5	3.4	3.3	3.4	3.0	2.7
Specialties	-0.6	1.0	3.8	3.8	3.9	4.1	3.8	3.6	3.3	3.3
Coatings	0.2	2.3	3.3	1.7	2.8	3.1	3.0	2.9	2.5	2.3
Other Specialties	-0.9	0.5	4.0	4.7	4.3	4.6	4.1	3.8	3.7	3.7

TABLE 7
Global Chemical Capital Spending

% Change Year-over-Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average 2021-25
Global Capacity	2.3	3.4	2.7	3.8	3.3	4.0	4.3	4.0	3.8	3.5
Global Capacity Utilization	83.6%	82.1%	82.2%	81.5%	81.5%	81.2%	80.7%	80.2%	79.7%	82.2%
Capital Spending (billion US\$)	\$401.1	\$426.9	\$439.2	\$450.0	\$470.3	\$500.0	\$536.5	\$573.8	\$608.0	n/a
% Change	9.2	6.4	2.9	2.5	4.5	6.3	7.3	7.0	6.0	n/a

TABLE 8
Global Economic Environment: Real GDP

% Change Year-over-Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average 2021-25
Real GDP										
United States	2.3	2.2	2.4	2.4	2.6	2.6	2.6	2.2	2.2	2.3
Canada	1.9	2.0	2.5	1.1	2.0	2.3	2.3	2.2	2.1	2.0
Mexico	4.0	1.4	2.1	2.3	2.8	3.3	3.5	3.6	3.6	3.5
Brazil	1.8	2.7	0.1	-2.7	-1.2	2.1	2.6	2.7	3.0	3.2
United Kingdom	-0.8	-0.5	0.9	2.5	2.4	2.3	2.3	2.3	2.3	2.1
Eurozone	-0.7	-0.4	0.9	1.5	1.7	1.8	1.6	1.5	1.5	1.4
France	0.3	0.3	0.4	1.1	1.4	1.6	1.4	1.4	1.4	1.5
Germany	0.6	0.2	1.6	1.6	1.9	1.8	1.5	1.3	1.3	1.2
Italy	-2.8	-1.7	-0.4	0.7	1.2	1.2	1.0	1.0	1.0	0.9
Spain	-2.1	-1.2	1.4	3.1	2.6	2.3	2.0	1.9	1.9	1.6
Russia	3.4	1.3	0.6	-3.9	-0.2	2.0	2.4	2.6	2.8	2.7
Japan	1.8	1.6	-0.1	0.7	1.2	1.0	1.0	1.2	1.0	0.8
China	7.8	7.8	7.4	6.8	6.4	6.2	6.1	6.0	6.0	5.1
India	5.1	6.9	7.2	7.5	7.4	7.4	7.4	7.4	7.3	6.5
South Korea	2.3	3.0	3.3	2.6	3.1	3.5	3.4	3.1	3.0	2.5
World GDP (Market Exchange)	2.4	2.4	2.7	2.6	2.9	3.1	3.1	3.0	3.1	2.7
World Trade	2.9	3.3	3.3	2.3	4.2	4.7	5.0	4.9	4.8	4.7

TABLE 9
Global Economic Environment: Industrial Production

% Change Year-over-Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average 2021-25
Industrial Production										
United States	2.8	1.9	3.7	1.5	2.0	3.4	3.2	2.7	2.5	2.6
Canada	0.9	1.8	4.2	-1.4	1.6	3.0	2.4	2.3	2.0	2.0
Mexico	3.6	-0.5	1.8	2.0	3.5	4.0	3.8	3.5	3.4	3.6
Brazil	-2.6	1.6	-3.1	-4.8	1.2	3.0	3.0	3.1	3.3	3.3
United Kingdom	-3.0	-0.2	1.4	0.4	1.4	1.7	1.4	1.3	1.3	1.3
Eurozone	-2.4	-0.7	0.7	1.5	1.9	1.9	1.9	1.8	1.4	1.3
France	-2.7	-0.6	-1.0	1.0	1.4	2.2	1.5	1.3	0.9	1.1
Germany	-0.3	0.2	1.3	1.3	2.0	1.7	1.6	1.5	1.4	1.5
Italy	-6.4	-3.1	-0.7	1.0	1.7	1.7	1.5	1.3	1.1	1.0
Spain	-6.9	-1.7	1.3	3.3	3.0	2.3	2.4	2.4	2.0	1.7
Russia	3.4	0.4	1.7	-2.9	0.8	2.3	2.4	2.4	2.7	2.8
Japan	0.2	-0.6	2.1	-0.8	1.3	1.7	1.7	1.7	1.2	0.8
China	10.1	9.7	8.3	5.6	5.9	5.7	5.7	5.7	6.0	5.4
India	0.7	0.6	1.3	5.2	6.7	6.6	6.7	6.6	6.7	6.6
South Korea	1.7	0.4	0.5	1.8	4.0	4.3	4.0	3.9	3.7	3.4
World Industrial Production	2.8	2.4	3.3	1.7	3.1	3.3	3.2	3.1	3.1	2.9

TABLE 10
Global Economic Environment: Inflation (Consumer Prices)

% Change Year-over-Year	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average 2021-25
Inflation (Consumer)										
United States	2.1	1.5	1.6	0.1	1.6	2.2	2.3	2.2	2.2	2.1
Canada	1.5	1.0	1.9	1.1	1.9	2.1	2.0	2.0	2.0	2.0
Mexico	4.1	3.8	4.0	2.9	3.5	3.3	3.3	3.3	3.2	3.2
Brazil	5.4	6.2	6.3	8.9	6.4	5.4	4.9	4.7	4.5	4.3
United Kingdom	2.8	2.6	1.5	0.1	1.3	1.9	1.9	2.0	1.9	1.9
Eurozone	2.5	1.3	0.4	0.1	1.1	1.5	1.6	1.7	1.8	1.8
France	2.2	1.0	0.6	0.1	1.0	1.4	1.3	1.4	1.6	1.9
Germany	2.1	1.6	0.8	0.2	1.4	1.8	1.7	1.7	1.8	1.7
Italy	3.3	1.3	0.2	0.2	0.8	1.2	1.4	1.6	1.7	1.9
Spain	2.4	1.5	-0.2	-0.3	0.9	1.2	1.5	1.6	1.7	1.9
Russia	5.1	6.8	7.8	15.1	8.2	6.1	5.1	4.8	4.3	4.6
Japan	0.0	0.4	2.7	0.8	0.7	1.8	1.5	1.4	1.5	1.6
China	2.6	2.6	2.0	1.6	2.0	2.4	2.7	2.9	2.9	3.0
India	10.2	10.0	6.0	5.4	5.5	5.5	5.6	5.3	5.2	5.0
South Korea	2.2	1.3	1.3	0.8	1.8	2.4	2.6	2.6	2.6	2.3
World Inflation	4.2	3.9	3.5	3.1	3.4	3.7	3.4	3.3	3.1	3.1

Methodology

This report presents an assessment of current conditions and expectations for the global business of chemistry, with particular emphasis on the U.S. The analysis uses economic data and publicly available information through late-November 2015.

In looking ahead, several models of global output, trade, etc. for the business of chemistry are employed. Also taken into account are the forecasts made by economists at the national chemical associations in Europe (whose expertise ACC gratefully acknowledges) and from economic forecasting consultants and other institutions. Also gratefully acknowledged is the macroeconomic and chemical industry expertise of IHS Global Insight and Oxford Economics, leading providers of economic advice and consultancy services. The macroeconomic forecasts of the Economist Intelligence Unit (EIU) were also important to our thinking as was the U.S. Industrial Outlook of the Manufacturers Alliance/MAPI. These were supplemented by forecasts provided by the Asian Development Bank, IMF, OECD, the WTO, and various banks.

For More Information

More details, historical data (back to 1994) and annual projections (to 2020 and beyond) for the tables in the report are available in spreadsheet format. For more information or to access the detailed data, contact ACC's Economics Department: ACC_EconomicsDepartment@americanchemistry.com

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