

U.S. Major Diversified Chemicals Industry

February 6, 2019

Materials Sector

Stock Rating

Market Weight

Investment Thesis

We recommend a MARKET WEIGHT position in the Major Diversified Chemicals Industry due to an increase in chemical production in 2018 and 2019 forecasts at a moderate rate. Automobile production is expected to maintain at a high level, and housing markets are set to stabilize. We also expect the GDP to grow at a moderate rate.

Drivers of Thesis

- Chemical production is expected to grow at a rate of 3.6% in 2019, following 3.1% growth in 2018.
- Exports of chemicals are set to grow nearly 10% in 2019 to 143 Billion.
- Global automobile production is stable and one of the largest consumers of chemicals.
- Domestic GDP is expected to grow at 2.3% in 2019.

Risks to Thesis

- An extended trade war would decrease chemical exports which would hurt the industries top line.
- The chemicals industry is highly correlated with the market due to diversification of end product sales. If the market goes down in 2019, the industry would suffer.
- If Construction spending were to drop, demand for products produced by the chemical industry would decrease.

Key Industry Statistics

Largest Companies by Market Cap

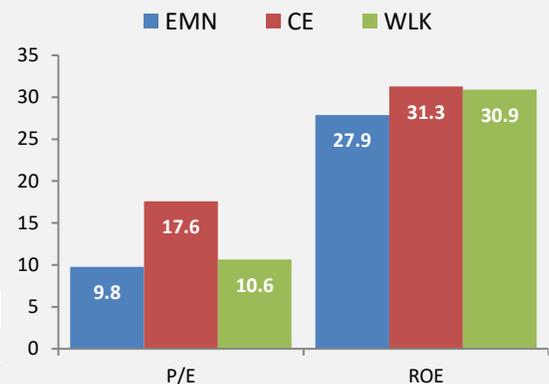
DowDuPont (DWDP)	120.5B
Celanese Corp. (CE)	13.3B
Eastman Chemical Co. (EMN)	11.5B
Westlake Chemical Co. (WLK)	9.7B
Huntsman Corp. (HUN)	5.3B

Debt to Equity as a Percent

DowDuPont (DWDP)	34.0%
Celanese Corp. (CE)	126.2%
Eastman Chemical Co. (EMN)	121.4%
Westlake Chemical Co. (WLK)	78.3%
Huntsman Corp. (HUN)	88.6%

Dividend Yield

DowDuPont (DWDP)	2.47%
Celanese Corp. (CE)	1.62%
Eastman Chemical Co. (EMN)	2.26%
Westlake Chemical Co. (WLK)	0.75%
Huntsman Corp. (HUN)	1.50%



Source: FactSet, Yahoo Finance

Revenue & EBITDA (Top 5 US Diversified Chemicals)

Year	2012	2013	2014	2015	2016	2017
REV	\$86.0	\$87.7	\$90.4	\$78.7	\$77.2	\$94.4
EBITDA	\$4.3	\$5.9	\$5.4	\$5.7	\$5.4	\$6.6

12 Month Performance



Source: Yahoo Finance

Industry Description

The major diversified chemicals industry consists of companies that convert raw materials into a variety of products. This differs from the specialty chemicals industry which specialize in a specific product line.

Product lines in the diversified industry include agriculture, fibers, and polyurethane's among others. End uses are diverse; however construction, housing, and transportation markets make up a large portion.

EXECUTIVE SUMMARY

We recommend a MARKET WEIGHT position for the major diversified chemicals industry. Chemical production grew 3.1% in 2018, and is expected to grow 3.6% in 2019¹. Growth in the industry is tied to construction, automobile, and housing growth among others. Exports also have a profound impact on the ability of these companies to grow, as many companies have a majority of their sales outside of the United States.

The Industry has high barriers to entry². Many of the machines used to process raw materials have high costs associated with them. This causes companies to incur high amounts of fixed costs. Companies also rely on preexisting relationships with customers, which can make breaking into the industry a challenge.

INDUSTRY DESCRIPTION

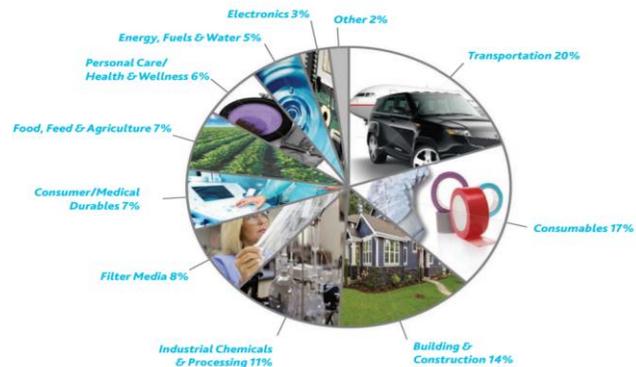
The major diversified chemicals industry is comprised of companies that produce a wide variety of different chemicals products. These include rubber products, acrylics, fibers, resins, and polymers. The main consumers of these products are other chemical companies, construction, and automobiles producers.

The biggest companies in this Industry in the United States are DowDuPont (DWDP), Celanese Corporation (CE), Eastman Chemical (EMN), Huntsman Corporation (HUN), and Westlake Chemical Corporation (WLK).

Globally the five biggest companies are BASF SE, DowDuPont, Saudi Basic Industries Corp., Mitsubishi Chemicals Holding Corporation, and Johnson Matthey Plc.

Industry Analysis

The chemicals industry, and specifically the major diversified segment, is a space filled with mature companies that produce a multitude of products. These products are used in many different industries and sectors. The Image above shows how Eastman Chemical Company's sales break down by end product use in 2017.



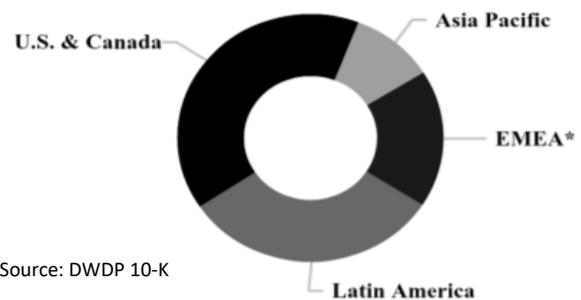
Source: EMN 10-K

Eastman is one of the main competitors in the United States. While other companies do not follow these percentages exactly, these segments do track reasonably well with others.

The biggest consumers of chemicals are transportation, consumables, construction, and the chemicals industry itself. However, those four only make up around 60% of sales. The other 40% is made up of a variety of end markets that help the chemical industry have a very diversified consumer base.

Not only is the end use of these chemicals diversified, but the locations they are used in are as well. Below is DowDuPont's net sales by geographic region. DowDuPont was the world's largest chemicals producer by net sales in 2017.

2017 Net Sales by Geographic Region (As Reported)



Source: DWDP 10-K

This sales trend is common throughout the industry as well. The chemical industry services many different regions worldwide. This means that they are exposed to many different international risks. Recently the trade war with China has been a large point of concern, as China is a large buyer in many different product segments.

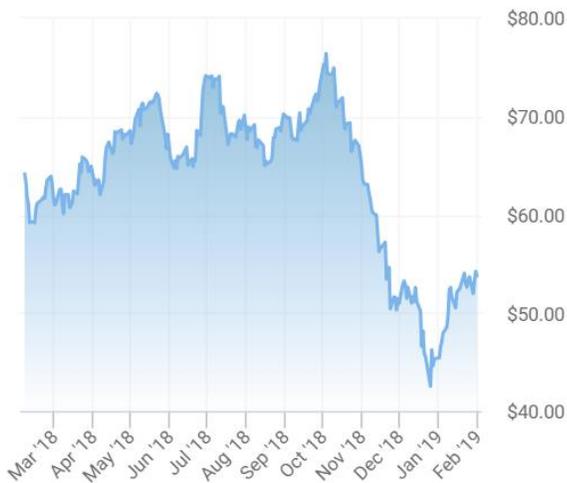
Overall, it is easy to see that this line of the chemical industry is diversified in many different products, in many

different regions internationally. However, transportation and construction are two that have a great impact, and can be used to analyze the industry going forwards. Oil and Natural Gas also have an interesting relationship with the industry, as they can drive the prices.

RECENT DEVELOPMENTS

Oil Prices & Natural Gas

Oil and natural gas are important to the chemical industry because they are used to create many of the products. While oil is the main input, natural gas is used for a variety of products too. Recently prices have dropped for both. Below is a chart of the oil prices.



Source: Oilprice.com

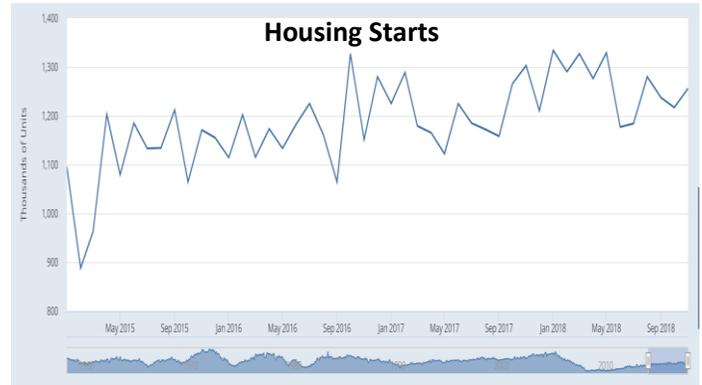
The prices of oil does not have a direct correlation with the company’s margins. When oil prices drop, so do the prices of some of the products. This leads to lower costs to produce, but lower end sales as the price of the product is lower. Companies with a geographic advantage to oil and natural gas wind up having a competitive advantage as well, as they can produce at lower cost. Volatility in the markets leads to changes in the cost structure, price setting, and Demand⁵. Going forward, Volatility is something to watch.

Housing Market

Housing and Construction makes up a sizeable portion of the chemical industries end use purchases. This derives from the materials used to build new houses. New homes

on average account for \$15,000 in sales attributed to the chemicals industry⁶.

Housing starts are a metric used to measure the construction of new homes across the United States. As weather is a large factor in construction, they are seasonally adjusted. Below is a graph of housing starts from 2015 through 2018.

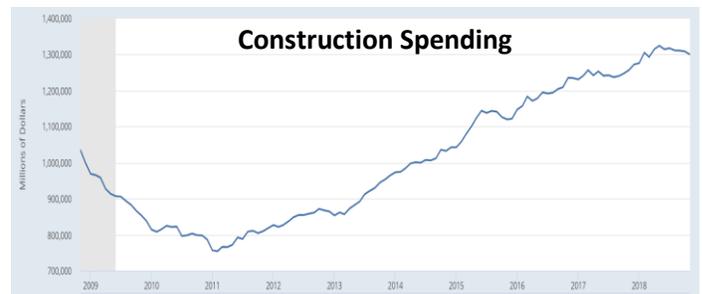


Source: FRED

January 2018 housing starts were at a 10-year high. However, since then they have fallen off. Year over year November was down 3.6%. This could be due to rising interest rates, or just a cyclical decline. Either way, fewer housing starts would have a negative impact on the chemicals industry going forwards. If they steady out at the current level, we do not think companies in this industry would be negatively affected at a high rate, as the current levels are high considering the last five years.

Construction Spending

As mentioned above, construction is a large part of the end market sales for the chemicals industry. From 2011 to 2018 the United States has seen a large growth in the amount of money spent on construction. After bottoming out in 2011 due to issues stemming from the recession, the industry has recovered.



Source: FRED

From October 2017 to October 2018 construction employment increased by 4.9%. At the end of September there was 278,000 construction jobs open, which was the highest September number since they began tracking it⁷. This is a sign that construction companies are busy and expecting more projects in the future.

The producer price index is used to monitor the price of the materials the companies use in specific industries. For construction specifically, the prices have gone up substantially in recent months.



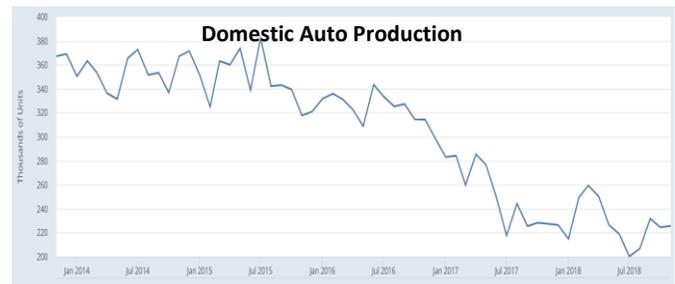
Source: FRED

A driver of these price increases has been tariffs pertaining to steel and aluminum. The companies in the chemicals industry would benefit off more spending by this industry due to the large amount of materials needed for construction products. It is possible that increases in metals prices could halt construction spending, indirectly causing less sales to the industry. If that does not happen, continued growth will benefit many chemicals companies.

Transportation Markets

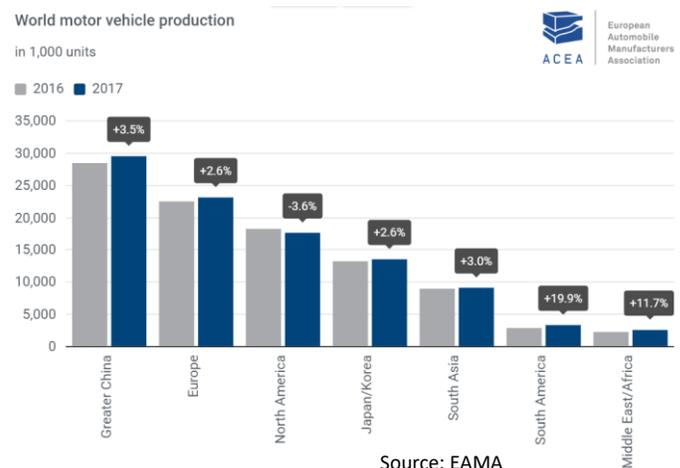
Transportation vehicles are listed on many companies' annual reports as an end use for a high number of their products. An increase in the amount of these vehicles produced in the coming years would serve as a driver for more demand for chemical companies. Each vehicle produced can account for up to \$3,250 in sales to the chemical industry⁶.

However, automotive markets have not been trending up as of late in the United States. Domestic auto production has been on a downward trend since July 2015.



Source: FRED

This is a trend that is mainly only being seen in the United States. Below is a chart of worldwide production from 2016 to 2017 in various regions around the globe. The United States is the only region to have less production year over year.



Source: EAMA

China and Europe are two that have a great impact on the chemical industry, as a high percent of their sales go to those regions. If these increases can continue in the next few years, this would provide more ground for the industry to create new sales in.

MARKETS AND COMPETITION

Peer Comparisons

In the United States there are five major public companies that compete in the diversified chemical industry: DowDuPont, Eastman Chemical Company, Huntsman Corporation, Westlake Chemical Corporation, and Celanese Corporation. Below is a table of important financial data that includes 2017 data.

	DWDP	EMN	HUN	CE	WLK
Revenue	62,374	9,514	8,358	6,140	8,041
EBITDA %	16.5%	23.6%	14.3%	20.6%	23.2%
ROE	2.41%	27.86%	24.47%	31.27%	30.89%
ROA	2.02%	8.80%	4.92%	12.86%	11.29%
P/E	78.26	9.78	12.75	17.57	10.64
Asset Turnover	0.45	0.6	0.86	0.76	0.7

Source: Factset, Yahoo Finance

The four smaller companies all operate within similar margins, while DowDuPont has smaller return on equity and assets, but still maintains a middle of the pack EBITDA margin.

DowDuPont

DowDuPont is the largest chemical company in the world based on 2017 revenue. Dow Chemical and Dupont completed a merger on August 31st 2017 to become the biggest company in the industry. They have three main divisions including Agriculture, Materials Science, and Specialty Products. They are headquartered in Midland, Michigan.

Agriculture is one of the main focuses of DowDuPont. “The Agriculture division brings together the strengths of DuPont Pioneer, Dupont Crop Protection and Dow AgroSciences to form a pure-play Agriculture company”. The line is split in sales between seed and crop production. In the future they are looking to add many new products, such as new fungicides and insecticides.

The Materials Science segment of their business is focused on three high-growth markets. Packaging, Industrial and Infrastructure, and consumer. Consumer consists of performance materials and coatings.

Specialty Products focus around four main consumer markets. Electronics, Nutrition, Transportation, and Construction. They combined for over 21 billion in sales from these four lines in 2017⁴.

When examining their financials with the rest of the industry, one thing that stood out was their high P/E ratio. The average of the 4 other similar companies is 12.69. However, DWDP’s is currently 78.26. This could stem from

a few factors, but one of the main one’s is that they are a much larger company than any of the others.

Eastman Chemical Company

Eastman Chemical Company develops products for multiple different industries. They were founded in 1920 in Kingsport, Tennessee. They are still headquartered there today. Their four main product lines are Additives, Advanced Materials, Chemical Intermediates, and Fibers.

The Additives line produces chemicals for many different industries. Some of the top ones are transportation, construction, and crop protection. They made up 35% of their total sales in 2017.

Advanced Materials totaled 27% of their revenue in 2017. The main products are films and plastics with differentiated properties that are used in transportation, construction, and durable goods among others. They believe that they have a competitive advantage in this segment due to long term relationships and scale in manufacturing.

Chemical Intermediates is the production of acetyl, olefins, and alkylamines. The large majority of these products are sold to the chemical industry, construction, and agrochemicals. They are also able to turn some products into raw materials through backward integration. They expect this line to grow in the United States and Europe in the future.

Fibers only contributed to 9% of their business. A lot of this comes from the sales of cigarette filters to multinational and regional cigarette producers³.

When looking at their margins the main thing that stood out was their healthy margins. They have an EBITDA margin of 23.6% which leads the group, and a return on equity of 27.86%. They have averaged a 3.6% annual growth rate on revenue since 2012.

Huntsman Corporation

Huntsman Corporation’s business is centered around four main product segments. Polyurethanes, Performance Products, Advanced Materials, and Textile Effects. They were founded in 1970, and are headquartered in Woodlands, Texas.

The Polyurethanes segment makes up 53% of their sales. A few of the products in this area are automotive seating, composite wood products, and insulation.

Performance products contribute 25% of their sales. These include products used in agro-chemicals, detergents, and gas treating.

Advanced Materials and Textiles when combined contribute 22% of sales. Products in these segments include coatings for construction materials, and polymer products that are replacing parts in aircraft and automobiles⁸.

2018 Year End & 2019 Forecast

DowDuPont's stock price dropped in 2018 from \$71.57 to \$53.48. A decrease of 25.3%. However, revenues increased from 62.3B to 86B. Some of this decrease is in line with the market. Although not all of it. DowDuPont is restructuring in 2019 and splitting into three different companies. This could have investors waiting.

Eastman Chemical Company dropped from \$93.43 to \$73.11. A drop of 21.7%. Revenues went from 9.5B to 10.2B. EBITDA margin dropped from 23.6% to 20.8%. When compared to the chemicals industry, and the materials sector, this is not far from expected.

Huntsman Corporation had the most extreme drop of the three in 2018. Their stock price fell from \$33.45 to \$19.29. a drop of 42.3%⁹.

We expect these companies to have better performance in 2019. A more stable economic market, along with continued construction spending and global growth in transportation markets should drive this. Through the first month of the year HUN, WLK, and EMN are outpacing the market with 15%, 14%, and 12% stock price growth. CE is in line with the SP500 index at a near 8% return. DWDP is the only one of the five trailing the market with nearly a 2% loss.

CHEMICALS VS THE MARKET

The chemicals industry is very connected to the overall economy. This is due to the end consumers of their variety of products being in many different sectors. Since they do not exclusively sell to one market, they are susceptible to market risk.

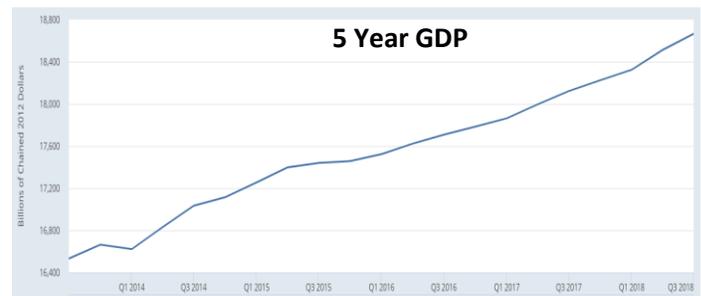
	EMN	HUN	WLK	CE	DWDP	SP500
5 Year CAGR	0.46%	-1.71%	3.07%	12.42%	7.24%	8.58%
Beta	1.10	1.30	1.15	.92	1.16	

Source: Factset, Yahoo Finance

As a whole this industry has underperformed the past five years from a CAGR standpoint. The entire sector of materials (XLB) has a CAGR of 4% over the same time period⁹.

ECONOMIC OUTLOOK

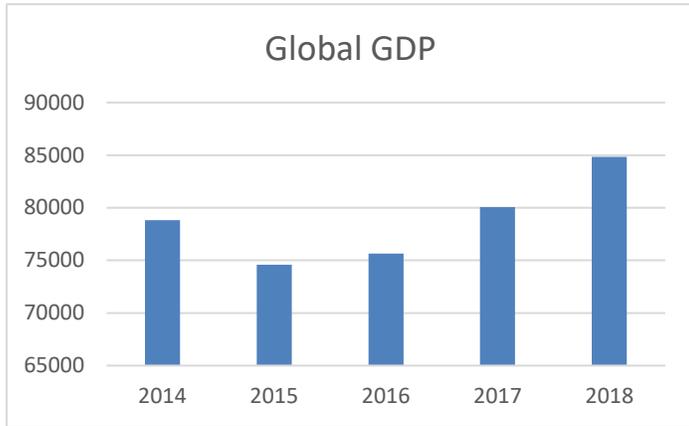
The GDP plays a large factor in this industry, as many of the products produced include a material or chemical that was produced by the chemicals industry. Thus, it is something to monitor going forward. The past 5 years have seen steady growth. After Q4 is factored in for 2018, it's forecasted to have grown at roughly 3% year over year.



Source: FRED

Forecasters expect the growth in 2019 to go down to 2.3%¹⁰. A bigger drop would negatively impact the industry in a variety of ways.

Since a large amount of sales come from outside the United States, Global GDP is also something of note when projecting sales in the industry. Below is a graph of the global GDP since 2014. After a dip in 2015, GDP has grown each year. We project that this will continue in the future at a slower rate.



Source: Statista

Interest rates should also have an impact on the industry indirectly through their consumers. With higher interest rates individuals will be less motivated to purchase new items, such as houses and automobiles. Interest rates have been on the rise since 2015, as the Fed is looking to stabilize the economy after lowering them post-recession. We think that the rate will see one increase in 2019, after 4 in 2018. The consensus is that it could be anywhere from 0-2.

INVESTMENT POSITIVES

- Growth in the transportation, construction, and housing markets would lead to growth in the industry.
- Chemical production is expected to rise in the United States, as well as exports by up to 10%⁵

INVESTMENT NEGATIVES

- A slowing economy would have a large impact on the industry, as there would be fewer buyers for the end products.
- Trade wars and tariffs could slow construction growth, having a negative impact on the industry.

KEYS TO MONITOR

There are many different prices and metrics that can have an impact on the chemicals industry. The ones that will have the greatest impact are GDP both globally and nationally. Construction spending, Housing starts, and Transportation markets are also important. While none of these markets individually will force a large shift in the

industry, a change in all of them caused by interest rates or other factors could. As the products are used in various markets in various geographic regions, worldwide GDP will play the biggest role in our forecasts.

REFERENCES

1. American Chemistry Council
2. NC State University - Supply Chain Resource Cooperative – Global Chemical Industry Analysis: Sustainability Industry Report Spring 2012
3. Eastman Chemical Company 10-K
4. DowDuPont 10-K
5. Mckinsey – Oil price shocks and the chemical industry: Preparing for a volatile environment
6. Chemical & Engineering News – US Chemical output set to rise in 2019
7. Contracting Business – 2019 Construction Outlook
8. Huntsman Corporation 10-K
9. Yahoo Finance
10. Federal Reserve – FOMC Projections

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