MORNING BRIEFING
June 28, 2018

Auto Imports & DNA Storage

See the collection of the individual charts linked below.

(1) Tariff message: Baby, you can't drive my car. (2) US is world's largest importer of cars. (3) US tariffs are low on cars but high on trucks. (4) US autos sold in Europe are mostly made in Europe. (5) Germany may be ready for a deal on autos. France, not so much. (6) Moody's warning. (7) S&P 500 Autos remain in a ditch. (8) DNA: Nature's hard drive set to blow away current data storage technology.

Autos: Driving on the Edge. Late-night talk-show host James Corden taps into our love of cars with his regular bit Carpool Karaoke. He invites popular musicians to sing and be interviewed while driving in a car. If talk of tariffs has got you down, a recent Corden drive with Paul McCartney down Penny Lane is sure to bring a smile.

Corden came to mind as we dug into the impact tariffs will have on the US and global auto industry. The verbal ping pong about tariffs between the world's leaders has the auto industry and its investors on edge. It's certainly not helping an industry that faces slowing sales growth. Try to keep smiling while we take a drive into the morass:

(1) *Tariff talk with Europe*. The US is the largest importer of motor vehicles in the world. "According to the European statistics office, Eurostat, the U.S. imported cars amounting to 254 billion euros ($296.12 billion) in 2016, while Europe imported only 77 billion euros," a 6/27 CNBC article reported. The EU places a 10.0% tax on auto imports, while the US places a 2.5% duty on auto imports. Perhaps it was with this in mind that President Trump threatened to impose a 20.0% tariff on cars imported from the EU.

EU officials have tried to justify their tariffs. "'It is true we have a slightly higher tariff on cars than the Americans … But they have much higher (tariffs), for instance, on trucks, on lorries, they have higher on shoes, on clothing,' Cecilia Malmstrom, the EU's trade chief said Wednesday," according to the CNBC article. "She told reporters in Brussels that the EU cannot simply remove the tariff on U.S. cars (10 percent) overnight, because under World Trade Organization (WTO) rules, the EU would have to do the same for every country in the world. 'And I don't think member states are willing to do that,' she added."

In the EU, it is Germany that exports the most cars to the US. German auto makers and suppliers export $34 billion worth of goods to the US each year, while Germany imports just $7.5 billion worth of American goods, a 6/20 *WSJ* article reported. The Germans counter that the US export numbers are low because GM and Ford build their cars in Europe. That said, Germany, which represented 55% of the total EU car exports last year, seems ready to negotiate.

German auto manufacturers reportedly back the elimination of all import tariffs on trans-Atlantic trade in automotive products and industrial goods. The German government supports such an effort as well.

However, such a proposal might face opposition in the US because it would eliminate the 25.0% US tax on imports of light trucks, including SUVs and pickup trucks. It would also require the elimination of tariffs on EU steel and aluminum products.

It might also face opposition in France. Unlike Germany, French car makers Renault SA and Peugeot SA don't export cars to the US, so any free-trade deal would be of little value to them. In fact, a deal could open the French market to unwanted competition.

(2) *Tariff talk with China*. The US places a 2.5% tariff on cars imported from China, and China puts a 25.0% tariff on cars imported from the US. Both countries place a 25.0% tariff on truck and SUV imports from the others country. In May, China said it would cut tariffs on car imports to 15.0%, but when President Trump ordered duties on Chinese goods, China reversed its offer to lower tariffs and threatened to increase them instead.

"About 267,000 U.S.-built vehicles were sold in China last year, according to research firm LMC Automotive," a 6/21 *WSJ* article reported. Ford exported 45,000 vehicles to China, Tesla exported 15,000, and Fiat Chrysler exported about 17,000 cars it made in the US to China. Most of GM's cars sold in China are produced in China. Daimler, BMW, and Volkswagen produce almost 500,000 vehicles a year in the US that are exported to China, Canada, Mexico, and Europe.

(3) *Impact on Americans.* Higher tariffs might help manufacturers, but they could hurt consumers, as the sticker price of an imported car might climb. If the Trump administration goes through with a 25.0% tariff, it would cost American consumers $45 billion annually, or $5,800 per vehicle, according to the Alliance of Automobile Manufacturers, a 6/26 Reuters article reported.

Moody's didn't even think manufacturers would come out winners. It warned that tariffs would be "broadly credit negative" for the auto industry. "A 25% tariff on imported vehicles and parts would be negative for nearly every segment of the auto industry—carmakers, parts suppliers, car dealers, and transportation companies … Should any tariffs be levied, carmakers would need to absorb the cost to protect sales volumes while hurting profitability; increase prices to pass the tariff costs to customers, which could hurt sales; or a combination of both," a 6/25 CNBC article reported.

(4) *Market reaction*. Relative to all the global bickering and tweeting about tariffs, the stock market reaction has been rather muted. For the week ending Tuesday, the S&P 500 Automobile Manufacturers stock index has fallen 3.0%, and the index is down 3.7% ytd (*Fig. 1*). It continues the relatively sideways action the Auto Manufacturers index has experienced over the past five years, after rebounding sharply in the wake of the 2008 selloff (*Fig. 2*).

Debbie expects auto sales to be slightly off their strong pace of recent years but to remain strong in 2018, north of 17 million saar. That's in line with LMC Automotive's forecast for 2018: total light-vehicle sales of 17.1 million units, a decrease of 1.0% from 2017. US motor vehicle sales in May came in at 16.9 million saar, with sales of domestic light trucks far outpacing sales of domestic cars (*Fig. 3* and *Fig. 4*).

(5) *Analysts' forecasts*. Analysts are not expecting much from the S&P 500 Auto Manufacturers (F and GM). The industry is expected to grow revenues by 0.9% this year, and revenues are expected to decline by 0.2% next year (*Fig. 5*). Earnings are forecast to decline 7.5% in 2018 and grow only 0.3% in 2019 (*Fig. 6*). The industry's shares trade at 7.0 times forward earnings per share, in line with where they've traded over the past three years or so (*Fig. 7*).

Earnings could take a hit if leaders around the world do as they say and raise tariffs around the world.

There's also some concern that auto loans have gotten aggressive in order to attract buyers and pay for cars and trucks that have increased in price. More loans with maturities beyond five years have been extended, and more high-risk borrowers have entered the mix, a 6/10 *WSJ* article reported. Meanwhile, the absolute amount of car loans outstanding has soared to a new record of $1.1 trillion (*Fig. 8*). Tariff saber-rattling isn't something the industry needs right now.

Data Storage: Nature's Hard Drive. Imagine storing all of the information in the whole world in the back of your SUV. That's what scientists are working on, but they're not using silicon and chips. They're using DNA. Biologists and computer geeks are collaborating to solve the world's data storage problem using nature's hard drive. Anyone invested in anything to do with data storage centers should keep an eye on this potentially disruptive technology. I asked Jackie to dive in, and here is her report:

(1) *Tapping nature's hard drive*. Molecular biologist Nick Goldman and his team at the European Bioinformatics Institute were among the first to use DNA to store data. His organization stores data about DNA from genomes that researchers around the world are creating. It's an enormous amount of information, and they constantly increase the data storage. He and his team were mulling the problem in an all-day meeting, and then went to a bar where they came up with the idea of using DNA to store information. Goldman does a great job of explaining the whys and hows in this 2015 presentation and in a 2013 TedxPrague talk.

DNA has four nucleotides—cytosine (C), guanine (G), adenine (A), and thymine (T)—that are arranged in a double helix. Goldman's group decided to take one megabyte of data—comprising a picture of their institute, a fragment of the audio recording of Martin Luther King's "I Have a Dream" speech, a pdf file of Watson and Crick's 1953 paper describing the shape of DNA, and William Shakespeare's 154 sonnets—and turn it into a code made of the letters of DNA, CGAT. They sent that code to Agilent in California, which made the strands of DNA holding their 1 megabyte of data.

The DNA came to Goldman's office in a test tube, and at first he thought there was nothing in it. But the data-holding DNA was there, looking like a tiny smudge of "dirt" at the bottom of the vial. If the whole finger-sized vial were filled with data-holding DNA, it would have contained the information of one million CDs. The team was able to retrieve the data from the DNA.

(2) *It's all about density*. The benefit of using DNA for storage is that it stores information in a very condensed, dense way. DNA can hold 1,000,000,000,000,000,000 (or a quintillion) bytes of data in a cubic millimeter. It's also easy to store. DNA can be kept for thousands of years in a cool, dry, dark space, like your refrigerator, which is far more energy efficient than today's data centers.

Microsoft and the University of Washington announced last July that they were able to store 200 MB of data in DNA strands. "The company is interested in learning whether we can create an end-to-end system that can store information, that's automated, and can be used for enterprise storage, based on DNA," Karin Strauss, Microsoft's lead researcher told the *MIT Technology Review* in a 7/7/16 article. "Strauss says the project is motivated by the fact that electronic storage devices are not improving as quickly as the amount of data we use grows. 'If you look at current projections, we can't store all the information we want with devices at the cost that they are,' she says." Microsoft's goal: to have a DNA-based storage system in a data center toward the end of this decade.

(3) *A race down the cost curve*. Why hasn't DNA storage disrupted the data storage industry? In a word: cost. "DNA synthesis companies like Twist Bioscience charge between 7 and 9 cents per base. Which means a single minute of high quality stereo sound could be stored for just under $100,000," explains an excellent 6/26 article in *Wired*. So the race is on to bring costs down.

The *Wired* article discusses Catalog, an MIT spinoff that's "building a machine that will write one terabyte of data a day, using 500 trillion molecules of DNA. They plan to launch industrial scale storage services for IT companies, the entertainment industry, and the federal government within the next few years—joining several much larger tech companies like Microsoft, Intel, and Micron that are funding their own DNA storage projects."

ARK Disrupt writes about a new way to make DNA faster and cheaper pioneered by the Wyss Institute and Harvard Medical School. "With enzymatic chemistry, researchers have cut the cost of DNA storage by ten-fold. Introducing principles of error correction, they have enabled accurate data retrieval with error-tolerance of up to 30% during the DNA synthesis process. This methodology is the biggest breakthrough in DNA storage systems to date. While $20 million to store a movie still is cost prohibitive, enzymatic chemistry increases the odds that DNA will disrupt the storage space at some point in time," ARK reports. The new science behind the breakthrough is laid out in a 6/18 *Science* article titled "New technique could help scientists create a gene in just 1 day."

Twist Bioscience "is one of a number of newly formed companies trying to improve DNA production, a list that now includes startups DNAScript, Nuclera Nucleics, Evonetix, Molecular Assemblies, Catalog DNA, Helixworks, and a spin-off of Oxford Nanopore called Genome Foundry," said a 5/22/17 article in *MIT Technology Review*.

More recently, a 4/6 *MIT Technology Review* article reported that Twist has offered customers the ability to store 12 megabytes of data in DNA for $100,000. In a few years, it hopes to reduce that cost to 10 cents. That's a number the entire data storage industry should watch closely.

CALENDARS

US. Thurs: Real GDP & PCE 2.2%/1.0%, GDP Price Index 1.9%, Corporate Profits, Jobless Claims 220k, Kansas City Fed Manufacturing Index, Weekly Consumer Comfort Index, EIA Natural Gas Report, Fed Releases Part 2 of Annual Bank Stress Test, Bullard. **Fri:** Personal Income & Spending 0.4%/0.4%, Headline & Core PCED 2.2%/1.9% y/y, Consumer Sentiment Index 99.0, Chicago PMI 60.1, Baker-Hughes Rig Count. (*Wall Street Journal* estimates)

Global. Thurs: Eurozone Economic Confidence 112.0, Germany CPI 0.2%m/m/2.2%y/y, Germany Gfk Consumer Confidence 10.6, UK Gfk Consumer Confidence -7, Japan Jobless Rate 2.5%, Japan Industrial Production -1.0%m/m/3.4%y/y, ECB Publishes Economic Bulletin. **Fri:** Eurozone Headline & Core CPI 2.0%/1.0% y/y, Germany Unemployment Change & Unemployment Rate -8k/5.2%, Germany Retail Sales -0.5%m/m/1.8%y/y, UK GDP 0.1%q/q/1.2%y/y, Canada GDP 0.0%m/m/2.6%y/y, Japan Consumer Confidence 43.8. (DailyFX estimates)

STRATEGY INDICATORS

Stock Market Sentiment Indicators (*link*): Our Bull/Bear Ratio (BBR) slipped further below 3.00 this week, after moving back above two weeks ago for the first time in three months. Our BBR declined for the second week this week to 2.59, following a five-week climb from 2.09 (lowest reading since November 2016) to 3.12. Bullish sentiment fell 7.9ppts over the two-week period to 47.6% this week after rising 12.4ppts the previous five weeks, to a 12-week high of 55.5%. Meanwhile, the correction count rose 7.3ppts the past two weeks to 34.0% after falling 9.6ppts the prior five weeks from 36.3% to 26.7%. Bearish sentiment climbed to 18.4% this week after edging down from 17.8% to 17.6% last week—which was the lowest since the last week of March; eight weeks ago, it was at 20.8%, which was the most bears since last November. The AAII Ratio fell to 59.7% last week after advancing the prior two weeks from 57.1% to 67.4%. Bullish sentiment slipped to 38.7% after rising five of the prior six

weeks from 28.4% to 44.8% over the period, while bearish sentiment rose to 26.2% last week after falling from 26.7% to 21.7% the previous week.

S&P 500 Earnings, Revenues & Valuation (*link*): S&P 500 consensus per-share forecasts for forward revenues and earnings rose to another record high last week. The forward revenue growth forecast improved 0.1ppt w/w to 6.1%, but forward earnings growth was steady at 14.7%. The forward profit margin remained steady at a record high of 12.2%, which is up from 11.1% prior to the passage of the TCJA in December and a 24-month low of 10.4% in March 2016. Forward revenue growth of 6.1% is little changed from an 80-month high of 6.3% at the end of February, and compares to a cyclical low of 2.7% in February 2016. The annual 2018 revenue growth forecasts was steady w/w at 7.7%, but 2019 improved 0.1ppt to 5.0%. Forward earnings growth of 14.7% is up from a 21-week low of 14.6% a week earlier, but that's down from 16.9% in February, which was the highest since October 2010. Still, that's up 3.6ppts from 11.1% prior to the passage of the TCJA, and up 9.8ppts from the cyclical low of 4.8% in February 2016. Turning to the annual earnings growth expectations, the earnings growth forecast for 2018 improved 0.1ppt w/w to 22.2%, but that for 2019 was steady at 9.9%. Energy's contribution to forward growth peaked at the start of 2017. The S&P 500 ex-Financials forward revenue growth forecast dropped 0.1ppt w/w to 6.3%, and the forward earnings growth forecast rose 0.1ppt to 13.8%. The S&P 500 ex-Financials forward profit margin fell 0.1ppt to 11.3% from a record high of 11.4%, but is still up from 10.4% before the TCJA. Valuations fell w/w, but maintained the distance between current levels and recent lows. The S&P 500's forward P/E dropped to 16.6 from 16.7, which compares to a 16-year high of 18.6 at the market's peak in late January and its recent low of 16.0 in early May. The S&P 500 price-to-sales ratio edged down 0.01ppt to 2.03, which compares to late January's record high of 2.16 and early May's low of 1.95.

S&P 500 Sectors Earnings, Revenues & Valuation (*link*): Consensus forward revenue forecasts rose w/w for eight of the 11 sectors, and forward earnings forecasts rose for 6/11 sectors. Utilities was the only sector to have both measures fall w/w, while these four had both measures improve w/w: Energy, Financials, Materials, and Tech. The per-share measures for forward revenues and earnings are at or around record highs for 4/11 sectors: Consumer Discretionary, Health Care, Industrials, and Tech. Forward margins are at record highs for 8/11 sectors, all but Energy, Health Care, and Real Estate. Energy's forward revenues and earnings are back on uptrends after stalling during 2016-2017, and its earnings have about tripled from their 18-year low in April 2016. Looking at last week's readings for forward growth among the 11 sectors, just two had a w/w improvement in their forward revenue growth forecast as three fell. Four sectors had a w/w improvement in forward earnings growth and three fell. Energy had both forward growth measures improve w/w, while Consumer Staples and Telecom had both measures weaken. Forward P/S and P/E ratios are down from their recent highs in early 2018 for all sectors, and less than half of the sectors improved w/w. Energy's valuations remain elevated relative to historical levels, but are slowly returning to normal now after soaring in 2016 when revenues and earnings collapsed. Energy's P/S ratio of 1.29 compares to a record high of 1.56 in May 2016, and its P/E of 17.8 is down from a record high of 57.5 then. Due to the TCJA, higher margins are expected y/y in 2018 for all sectors but Real Estate, but that sector's forward earnings includes gains from property sales and typically improves as the year progresses. Utilities had its forward profit margin edge up 0.1ppt w/w, and M&A activity helped Telecom surge 1.3ppts to another record high. Five sectors had their forward profit margin drop 0.1-0.2ppt w/w: Consumer Discretionary, Financials, Health Care, Industrials, and Tech. Here's how the sectors rank based on their current forward profit margin forecasts: Information Technology (22.7%), Financials (18.6), Real Estate (16.2), Telecom (14.7), Utilities (12.5), S&P 500 (12.2), Materials (11.2), Health Care (10.5), Industrials (10.1), Consumer Discretionary (8.0), Consumer Staples (7.6), and Energy (7.2).

US ECONOMIC INDICATORS

Durable Goods Orders & Shipments (*link*): Both core capital goods orders and shipments were stalled around recent highs in May, while overall durable goods orders fell for the second straight month. Nondefense capital goods orders ex aircraft (a proxy for future business investment) edged down -0.2% last month, following a large upward revision to April (to 2.3% from 1.0%); these billings have been on a volatile uptrend—climbing 4.4%—since posting a sharp drop during the two months ending November. Meanwhile, the comparable shipments measure (used in calculating GDP) ticked down 0.1%, following a 1.0% gain and a 0.7% loss the prior two months. Core capital goods orders expanded 4.5% (saar) during the three months through May, based on the three-month average, up from Q1's 1.5% pace, though slower than April's 7.4%. The comparable shipments measure expanded 1.8% (saar), slowing steadily from the double-digit gains at the end of last year. Total durable goods orders slumped -0.6%, driven by the largest drop in motor vehicles & parts (-4.2%) since January 2015, while April's -1.0% drop was led by a -30.3% plunge in the very volatile commercial aircraft orders. Excluding transportation, billings slipped -0.3% last month after a three-month jump of 3.7%.

Pending Home Sales (*link*): The Pending Home Sales Index (PHSI)—measuring sales contracts for existing-home purchases—fell for the second straight month in May to the second lowest level over the past year. The PHSI slipped -0.5% to 105.9 last month, and was down -2.2% y/y—the fifth straight y/y decline. A large decline in contract activity in the South (-3.5%) last month offset gains in the Midwest (2.9), Northeast (2.0), and West (0.6), though on a y/y basis, sales were below year-ago levels in the Northeast (-4.8% y/y), West (-4.1), and Midwest (-2.5), while sales in the South were flat with a year ago. NAR's Chief Economist Lawrence Yun noted, "Realtors in most of the country continue to describe their markets as highly competitive and fast moving, but without enough new and existing inventory for sale, activity has essentially stalled." Yun now forecasts existing-home sales in 2018 will decrease -0.4% to 5.49mu—down from 5.51mu in 2017.

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